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Original Article

Effectiveness of Muscle Energy Technique and Manipulation in The Management of Non-Specific Backache; A Randomized Control Trial

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ABSTRACT

Backache is the most common musculoskeletal impairment in general population worldwide. **Objective:** To evaluate the effectiveness of MET and manipulation in the management of non-specific backache. **Methods:** After getting the REC approval from The Neurocounsel Clinic, Islamabad this study was initiated. Duration of study was 6 months from September 20, 2022 to March 19, 2023. Simple convenient sampling technique was done for data collection and total 30 patients of both genders between age of 18-50 years old who had backache due to mechanical cause or had no comorbidity of any kind. Those patients who had a) Lumber disc disease, b) Spondylolisthesis, c) previous back surgery, d) cardiac disease, e) pain <3 on NPRS, f) Parkinson disease were excluded. Two equals (n=15 each) were formed named as group A (MET) and group B (Manipulation). 3 sessions/ week for 3 weeks were given to each group along with heating pad (10minutes). SPSS version-22 was used for data analysis. NP test was used for between groups analysis and level of significance was kept $p<0.05$. **Results:** The mean age of patients in group A was 28.25 ± 5.53 whereas of group B it was 34.73 ± 10.66. Between groups analysis revealed that there was no significant difference ($p>0.05$) between both groups. **Conclusions:** It was concluded from the result of current study that both MET and manipulation are equally effective in the pain reduction and QoL enhancement in NSLBP sufferers.

INTRODUCTION

Backache, is the most common musculoskeletal impairment in the general population worldwide [1, 2]. More than 85% of individuals experience backache one in their life time. Around 30-39% of this condition resolves within 2-3 weeks and in remaining individuals it becomes a chronic morbidity [3, 4]. According to the global burden of disease (GBD), this is placed at 6th rank among 290 musculoskeletal conditions which results in greater socioeconomic burden [5]. Due to this the level of productivity and work-related activities of the sufferers are impacted the most which in turn affects the healthcare cost in billions of dollars annually [6]. Non-specific low

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back pain (NSLBP) arises due to many reasons such as muscular insufficiency, muscular imbalance, faulty mechanics, postural impairment and inadequate supply of blood to muscles [7, 8]. There are many interventions in literature which are commonly employed to the treatment of this disease. First line management includes the pharmacological intervention in which muscle relaxants (tizanidine), NSAIDs (Ibuprofen), opioids, antidepressants and pregabalin are mainstream drugs which are used [9, 10]. Non-pharmacological intervention includes the physical therapy and bed rest with lifestyle modifications. In physical therapy there are many methods which are used to treat the NSLBP such as manual therapy exercises (MET), manipulation, kinesio tape, braces, stretches and modalities. In modalities most frequently used are SWD, Microwave diathermy, Interferential currents, TENS, NMES, Ultrasound and low laser [11, 12]. One of the effective techniques invented by Fred Mitchell was the muscle energy technique which is used to reduce the muscle spasm (muscle relaxation) and increases the muscle elasticity as well as strength. This technique has two basic components, one is post isometric relaxation and post facilitation stretch. This technique is most commonly used intervention in physical therapy for the management of backache even patient can perform this exercise at home. Many studies have reported that MET is as efficacious as manipulation of lumber spine to enhance the ROM, pain reduction and disability alleviation [13]. Manipulation is another technique which is used by many physiotherapists in the LBP management. Manipulation induces the relaxation of mobility restricted area by unlocking the facet joints of affected region of spine. As a result, relaxation and ROM gain occurs instantly. It has been reported in literature that manipulation has the same effects as of NSAIDs because it as neurophysiological effects [14]. As reported by Salman *et al.*, in their study that MET and manipulation are effective in the management of non-specific neck pain, both of these techniques could be used for the management of non-specific backache as no such intervention in combination had been used in literature for this condition [15]. The purpose of this study was to evaluate the effectiveness of MET and manipulation in the pain management and quality of life enhancement in NSLBP individuals.

METHODS

Current RCT (Randomized control-trail) was initiated after getting approval from the ethical review committee of The Neurocounsel Clinic Islamabad. The duration of this study was six months from 20th September 2022 to 19th March 2023. Sample size was calculated by Epitool which came as 30. Simple convenient sampling technique was done for recruitment of patients in current study. Both genders between age of 18-50 years old were included in this study who had backache due to mechanical cause or had no comorbidity of any kind. Following individuals were excluded from the study a) Lumber disc disease, b) Spondylolisthesis, c) previous back surgery, d) cardiac disease, e) pain <3 on NPRS, f) Parkinson disease. Two equal groups (n=15) were formed. Group A (interventional group) received muscle energy technique along with 10 minutes of heating pad to low back area. In MET, PIR technique was employed at the rate of 6-10 stretches, each stretch was of 15 seconds following a 10 seconds relaxation 2 times a day for 3 session per week for 3 weeks. Group B (Control group) was given lumber spine manipulation (HVLA thrust technique) 1x/day for 3 session per week with a total 3 weeks of interventions along with 10 minutes of heating pad to lower back area. Total 9 sessions were incorporated in this study and results were evaluated on the basis of pain, quality of life and disability by use of following tools, a) NRPS, b) EQ-5D-5L (QoL). Evaluations were done at baseline and after end of study. SPSS version 22.0 was used for the statistical analysis of data. Normality of data were checked by use of Shapiro Wilk test. As our data were non-normally distributed, we used non-parametric tests (Man-Whitney U test) for between groups analysis. $p<0.05$ was kept as level of significance in this study with CI=95%.

RESULTS

Total 30 patients were included in current study. Two equal groups of 15 patients in each group were formulated. The frequency of age between 18-30 years of patients in group A was 09(60.1%) whereas in group this frequency was 06(40.2%). The frequency of participants in between age group of 31-40 & 41-50 years in group A was 04(26.6%) & 02(13.3%) while in group B this frequency of participants was 03(19.6%) and 06(40.2%) respectively. From the perspective of gender distribution, it was found that there were 08(53.3%) of males and 07(46.7%) females in group A while such distribution in group B was found that the frequency of male participants was 06(39.7%) and of females it was 09(60.3%). Marital status distribution in current research showed that there were 05(33.3%) singles in group A while in group B 08(53.3%) patients were single and married patients in group A were 10(66.7%) whereas in group B there were 07(46.7%) (Table 1).

Table 1: Frequency distribution

Variable	Groups	Frequency (%)
Age		
18-28	A	09(60.1)
	B	06(40.2)
31-40	A	04(26.6)
	B	03(19.6)
41-50	A	02(13.3)
	B	06(40.2)

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Gender		
Male	A	08(53.3)
	B	06(39.7)
Female	A	07(46.7)
	B	09(60.3)
Marital Status		
Single	A	05(33.3)
	B	08(53.3)
Married	A	10(66.7)
	B	07(46.7)

The mean age of patients in group A was 28.25 ± 5.53 whereas of group B it was 34.73 ± 10.66. (Table 2).

Table 2: Descriptive Statistics

Variable	Groups	Mean ± SD
Age	A	28.25 ± 5.53
	B	34.73 ± 10.66

As our data were non-normally distributed which was demonstrated by Shapiro wilk test ($p<0.05$), so we performed Man Whitney U test (NPT) to analyze the difference between groups. The descriptive statistics were illustrated in the form of median and interquartile range (IQR). On the basis of numeric pain-rating Scale (NPRS), in group A median and IQR at baseline was 7(3) while in group B it was 6(2). After the 3 weeks of intervention both groups median and IQR values reduced to 2(1) in group A and 3(2) in group B with U-value 110.50 at baseline and 107.50 after 3 weeks of exercises. As, p-value was greater than 0.05 post intervention which revealed that there was no significant difference between both groups and both interventions were equally effective in the reduction of pain on NPRS in non-specific backache individuals (Table 3).

Table 3: Comparison between groups in the basis of NPRS

Intervals	Groups	MD (IQR)	U	p-value
At baseline	A	7(3)	110.50	0.93
	B	6(2)		
After 3 weeks	A	2(1)	107.50	0.82
	B	3(1)		

When comparison was made on the basis of health-related quality of- life in NSLBP participants it was found that there were improvement in both groups as median and IQR score reduced in all parameter of EQ-5D-5L questionnaire except in overall score where increase in score meant there is an improvement so, overall health score median and IQR improved in this parameter. But when analysis was made Man Whitney U test revealed that there was no significant difference between the both type of interventions because $p>0.05$. This showed that both interventions were found to be equally effective in the management of NSLBP sufferers. All median, interquartile ranges, U-values and p-values are depicted in table 4.

Table 4: Comparison between groups on the basis of EQ-5D-5L (QoL)

EQ-5D-5L (QoL)	Groups	MD (IQR)	U	p-value
Pre intervention Mobility	A	4(2)	90.00	0.36
	B	3(2)		
Pre intervention Selfcare	A	4(2)	101.0	0.65
	B	3(1)		
Pre intervention Usual activities	A	5(3)	84.00	0.25
	B	4(2)		
Pre intervention Pain/ Discomfort	A	4(3)	105.0	0.77
	B	4(2)		
Pre intervention Anxiety/ Depression	A	3(2)	103.5	0.71
	B	5(3)		
Post intervention Overall Health status	A	20(15)	74.00	0.10
	B	22(17)		
Post intervention Mobility	A	2(1)	83.50	0.23
	B	2(1)		
Post intervention Selfcare	A	2(0)	68.50	0.06
	B	1(0.5)		
Post intervention Usual activities	A	1(1)	101.50	0.65
	B	1(1)		
Post intervention Pain/ Discomfort	A	2(1)	92.50	0.41
	B	2(0)		
Post intervention Anxiety/ Depression	A	1(0.5)	99.20	0.59
	B	2(1)		
Post intervention Overall Health status	A	85(18)	85.00	0.26
	B	77(10)		

DISCUSSION

This study was conducted to evaluate the effectiveness of muscle energy technique and manipulation in the management of non-specific backache on the basis of pain and quality of life. Tools used for evaluation were NPRD and EQ-5D-5L. It was concluded from the results of this study that both MET and manipulation are equally effective for the management of non-specific backache sufferers. Dhinkara *et al.*, conducted an RCT in which they compared muscle energy technique with conventional strengthening exercises. They formulated two groups same as of our study (n=15 each group). They gave 6 sessions of exercises and evaluated on the basis of Visual analog scale (VAS) and ODI (Oswestry disability index). Post intervention results depicted that MET is somewhat more effective in reducing pain and enhancing functional outcome in backache patients as compared to conventional exercises. Our results of our study are in coherence with this study that MET is an effective intervention in NSLBP management. [16]. Fahmy *et al.*, conducted an RCT to compare the efficacy of MET and MEE (McKenzie extension exercises) in the management of non-specific back pain. They recruited 40 subjects in their study and divided them into two equal groups (n=20 each). Duration of study was of 3 weeks same as of current study and they gave total 12 sessions but, in our study, we gave 9 sessions in total. Their evaluation

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revealed that both interventions are equally effective in reduction of pain severity (VAS) and also function disability (ODI). Our results are positive supported by this study as well [17]. Ghasemi *et al.*, conducted RCT to compare the effectiveness of MET, CST (cranio sacral therapy) and SMT (Standard manual therapy). Tools used for evaluation were VAS & ODI. They gave total 10 session to each group at the rate of 2x/week for 5 weeks. Their results revealed that all interventions were effective in pain & depression reduction, improving the functional disability and in enhancing the quality of life. Our results are in coherence with this study [18]. An RCT was carried out by Patel *et al.*, to evaluate the effectiveness of MET and NTM (Neural tissue mobilization) in NSLBP sufferers. They included 20 patients in their study and divided them into two equal group (n-=10 each). Duration of their study was 2 weeks and they gave total 5 sessions to each group. Evaluation was done by the use of VAS and ODI scale. Results of their study depicted that both interventions are effective in management of LBP pain and improvement of functional outcome and ROM of hamstrings. Our results are positively supported by this study [19]. Sturion *et al.*, conducted a study to evaluate the efficacy of MET and manipulation (HVLA) in the management of backache. They formed two groups (n=5 in each group). They gave 3 sessions at the rate of 1 session/week for three weeks. Their results demonstrated that both interventions are equally effective in the pain reduction (NPRS, MPQ) & disability reduction (RMDQ). Current study used the same intervention as of this study with more treatment sessions than aforementioned study. Our results are in coherence with this study [20]. Licciardone *et al.*, conducted a narrative review to evaluate the efficacy of osteopathic manipulation (HVLA) in the management of NSLBP. Result of their review depicted that spinal manipulation is an effective technique in pain & disability reduction in LBP sufferers. Our results are in coherence with this review [21].,

CONCLUSIONS

It was concluded from the result of current study that both muscle energy technique and manipulation (HVLA) are equally effective in pain reduction and in improving the quality of life of NSLBP sufferers.

Authors Contribution

Conceptualization: SK
Methodology: MT, LM
Formal analysis: SK, SS
Writing-review and editing: SK, SS, MT, LM, AA, NK, MS

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Conflicts of Interest

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