

Effectiveness of Manual Therapy Vs Exercise Therapy in the Management of Chronic Neck Pain with Postural Correction Education and Home Exercise Plan: An RCT

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ABSTRACT

The prevalence of musculoskeletal pain is quite diversified all over the world. This study was conducted at the Institute of Physical Medicine & Rehabilitation, Dow University of Health Sciences to find out the best possible treatments of musculoskeletal pain. Subjects both male and female were selected through systematic random sampling technique with history of chronic neck pain. Patients were divided into two groups randomly, group A received manual therapy with joint mobilization (Maitland), soft tissue mobilizations and selected exercise program. Whereas, group B only received exercise therapy and both groups were given supervised home exercise program followed by postural correction education. Home exercise program (HEP) was divided into two phase, Phase I was for initial 4 weeks and phase II was more advanced exercise program for the next 4 weeks. At the end of one month patient's pain score were reassessed on Visual Analogue Scale (VAS) and home exercise plan was frequently asked to perform daily at home. After two months both groups were re-evaluated for pain through Visual analogue scale and then neck pain and disability through Neck Disability Index (NDI).

Results: During a period of 6 months, 40 patients were included with no drop out. Figure 4.1 shows almost equal gender ratio in both groups. According to Figure 4.2 mean age in manual therapy group (Group A) was 41.57 and in exercise therapy (Group B) was 43.09. After the 8th week of intervention, manual therapy (Group A) shows significant decrease in Visual Analogue Scale i.e. patient reported less pain as compare to exercise therapy group (Group B). Both interventions manual therapy versus exercise therapy showed significant difference between the NDI scores within the groups with respect to the (p-value<0.416). Results suggested significant reduction in neck pain in both groups over the time duration of 8 weeks with respect to VAS (visual analogue scale) (p=0.001). Similarly, statistically significant improvements were noticed in neck pain and disability

on NDI (neck disability index) score in both groups. Results were statistically significant for manual therapy group and higher improvement scores were observed on VAS.

Keywords: Chronic neck pain, manual therapy, soft tissue mobilization, visual analogue scale, neck disability index

Introduction:

The musculoskeletal complaint is one of the most prevailing etiology for disability pension and sick leave that represents a major health issue in the society (Hagen et al., 2011). The most common cause of musculoskeletal pain incorporates the daily routine activities that exhibit repetitive or unusual strains on the system, musculoskeletal diseases and acute traumatic events (I, Hossain., 2011). Some researchers also delineate other causes such as; repetitive movements, postural strains, exertion of muscles and prolonged immobilization (Lalumandier J, et al., 2001). The twitching and burning of muscles is one of the most common symptoms of musculoskeletal pain but many studies conclude that the symptoms vary from person to person that includes sleep disturbances, pain and fatigue that may occur in whole body. The diagnosis can be performed by physical examination, diagnostic studies and by the aid of medical history as well (Hagen K et al., 1997). The pain referred as musculoskeletal pain exists in almost 10% of general population stated by the ACR criteria of 1990. The pain can prevail in all ages but it is more likely to be experienced by the population underlying the age group of 50-74 years (JT Grant., 2003). To determine the prevalence of clinically significant and reported occurrences of musculoskeletal pain, a cross-sectional survey was carried out that revealed the result that verified the prevalence of spinal pain in terms of the time period reported as one month was 29%, out of this half of the population was going through severe and chronic, 20% was intense, disabling and chronic while, 40% was chronic. Subsequently, 75% patients reported back pain whereas, 89% patients reported neck pain (Webb R et al., 2003).

The problems associated with neck pain is more commonly seen in the adult general population that demonstrates a typical 12-month prevalence that approximately ranges from 30% to 50% (Coggon D et al; 2013). Moreover, multifarious consistent evidences are found with respect to the other health problems associated with the neck pain incorporating other musculoskeletal complaints for instance, headache, low back pain and poor self-rated health (Martin BI et al, 2008).

The pain associated with neck has proven to be a financial burden on the society due to the reason that these symptoms demands extended duration of sick leave from the workplace and escalated utilization of required health care services (Driessen MT,. 2012). This is due to the health care costs that is required to treat the disorder (Murray CJ ,et al;2015). Many of the strong evidences verify the therapeutic benefits of multifarious therapies that can be movement therapy, manual therapy, physical therapy or mobilization in combination with supervisory movement intervention (DG Borenstein,. 2007) . Researches have predicted the higher rate of efficacy related to manual therapy that is spinal mobilization that also costs less than the general practitioner or physiotherapy (Korthals-De et al ,. 2005) .For the management of neck pain many non-invasive treatments are now available that includes; exercise therapy, cervical collars, mobilization, manipulation, soft tissue work, acupuncture regime, electrotherapy, electrical nerve stimulation, ice application and medications like steroids and NSAIDS (Akhter S et al ,. 2014) .Many studies have portrayed some approaches regarding the cervical pillows being effective in reducing neck pain incorporating the advices related to pillow adaptation or alteration(Shields N, et al ,. 2006).

MATERIAL AND METHODS

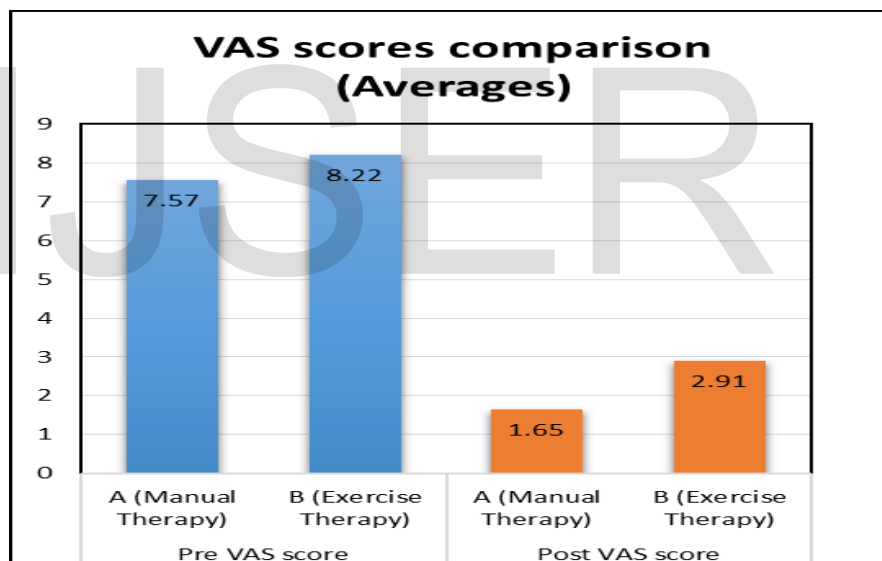
A Randomized Controlled Trial was conducted in Institute of Physical Medicine and Rehabilitation, Dow University of Health Sciences, Karachi, Pakistan. The sample size was calculated through open Epi for mean differences with 99% confidence interval. As we get $n=22^{10}$ which is minimum requirement for research we will take 40 sample size, 20 in each group. Simple Random Sampling technique was conducted. Subjects Men and women having chronic neck pain with age between 20 to 55 years with or without radiculopathy with complain of neck pain for more than 3 months were included. Subjects with Medical or surgical history, cervical disc herniation , vertebral fractures, Cardiovascular, musculoskeletal, neurological, were excluded. The subjects were asked to fill the questionnaire at IPM&R, by acquiring the information concerning their neck pain and the disabilities regarding chronic pain that limits them from daily life activities known by the name of Neck Disability Index. Each participant signed the informed consent form which was available in both Urdu and English format for their convenience.. Subjective assessment is conducted to see the intensity of pain that rates from mild to severe or can

also be demonstrated as numbers from 0 to 10. The patients of both groups were asked to rate the intensity of their pain through the scale before the therapy at first visit and after the therapy after 8 weeks. Data was analyzed on SPSS version 16.0.

RESULTS:

The results show the total scoring of visual analogue scale determined by the questionnaires given to the participants before and after treatment. According to the outcomes, the participants experienced less pain in comparison to pre-treatment VAS scores. On the other hand, after the 8th week of treatment manual therapy (Group A) shows significant decrease in VAS scale i.e. patient reported decreased pain as compare to Group B i.e. exercise therapy group. See Figure 1:

FIGURE 1 VAS Score Comparison



Comparison Of Treatment Within And Between Groups

Results showed that Neck Disability Index pre-score of Group A range from severe to complete neck disability and Neck Disability Index post-score minimizes to mild to moderate disability according to interpretation of Neck Disability Index Scores. Whereas, Group B pre and post Neck Disability Index score also showed more or less similar changes.

Table 4.1

Table: 4.1 (NDI FOR TREATMENT)

Session / Treatment		Group A	Group B	Mean Diff(P-value)
Pre	Mean ± SD (Min–Max)	41.86 ± 6.16 (31 - 51)	40.60 ± 6.14 (28 - 50)	1.26 (0.530)
Post	Mean ± SD (Min–Max)	14.78 ± 2.50 (11 - 20)	14.08 ± 2.62 (10 - 20)	0.69 (0.416)
Pre vs Post		27.08 (< 0.001**)	26.52 (< 0.001**)	

**Significant at 1%

Comparison Of Treatment Within And Between Groups

The results showed that there is a significant difference between the NDI scores within the groups with respect to the pre scores of genders (p-value=0.004) but not significant for post scores (p-value=0.483). The average NDI score is greater for males in both cases i.e. pre and post scores. There is a significant difference present between the pre and post scores for group A and B NDI with respect to gender (p-value<0.001) and (p-value<0.001) respectively. Table 4.2

TABLE 4.2 (NDI FOR GENDERS)

Session / Treatment		Male	Female	Mean Diff(P-value)
Pre	Mean ± SD (Min–Max)	44.66 ± 6.45 (28 - 51)	39.58 ± 5.29 (30 - 50)	5.08 (0.004**)
Post	Mean ± SD (Min–Max)	14.80 ± 2.70 (10 - 20)	14.25 ± 2.51 (10 - 20)	0.54 (0.483)
Pre vs Post		29.86 (0.001**)	25.33 (< 0.001**)	

**Significant at 1%

Comparison Of Vas Score Within And Between Groups:

The following observations shows that there is a significant difference between the VAS scores within the groups with respect to the pre scores of treatments (p-value=0.010) and

post scores (p-value=0.001). The average NDI score is greater in group B for both cases i.e. pre and post scores. There is a significant difference present between the pre and post scores for group A and B NDI (p-value<0.001) and (p-value<0.001) respectively. Table 4.3

TABLE 4.3 (VAS FOR TREATMENT)

Session / Treatment		Group A	Group B	Mean Diff(P-value)
Pre	Mean ± SD	7.57 ± 0.84	8.22 ± 0.85	-0.65 (0.010**)
	(Min–Max)	(6 - 9)	(6 - 9)	
Post	Mean ± SD	1.65 ± 0.71	2.91 ± 0.94	-1.26 (< 0.001**)
	(Min–Max)	(1 - 3)	(1 - 4)	
Pre vs Post		5.92 (< 0.001**)	5.31 (< 0.001**)	

**Significant at 1%

Difference Of Pre And Post NDI (Both Groups)

(Marginal Homogeneity TestSignificant at 1%)**

The marginal homogeneity test in the following table shows that the p value<0.001, hence the dependent sample means are significantly different for both pre and post scores of Group A and B. **Table 4.4**

Table 4.4 Difference Of Pre And Post NDI (Both Groups)

		Group A and B		Total	P-value
Pre		Post			
Group A	Severe	Mild (n=22) 02 (50.0%)	Moderate (n=24) 02 (50.0%)	04	<0.001**
	Complete	08 (42.1%)	11 (57.9%)		
Group B	Severe	04 (100.0%)	0 (0%)	04	<0.001**
	Complete	08 (42.1%)	11 (57.9%)	19	

**Significant at 1%

Discussion:

Chronic neck pain is a common musculoskeletal condition found these days. For the purpose to evaluate intervention for neck pain, a comparative study was conducted to

evaluate the effectiveness between manual therapy and exercise therapy along with home-exercise program and postural correction education.

Current study shows the prevalence narrated for chronic neck pain in the literature, documenting burden in females around at the age group of 35-49 years⁽⁹⁸⁾. Hence outcome of present study can relate its prevalence in this age group and it can be said that there is a high risk of exposure to chronic neck pain in females after the age of 35 years.

During the course of two months, there were significant differences between the intervention groups. Manual Therapy was more effective than Exercise therapy. Visual Analogue Scale shows significant decrease in neck pain in manual therapy group and patient reported decrease in pain intensity as compared to exercise group. Based on previous researches, a systematic review in 2010 assesses if manual therapy, including manipulation or mobilization, combined with exercise can improve pain, function/disability, quality of life, global perceived effect, and patient satisfaction for adults with neck pain.

Current study reveals that none of two interventions is superior over another. Manual therapy along with joint mobilization and soft tissue mobilization versus exercise therapy designed for managing neck pain, reduced the pain intensity, increase range of motion of neck and NDI (Neck Disability Index) showed decrease in pain and disability level. But exercise therapy group showed more or less similar results on NDI.

A study by H.Sarig Bahat in 2003 determined various exercise methods that are effective in treating different mechanical neck disorders among adults⁽¹⁹⁾. Study findings revealed very strong evidence supporting the effectiveness of proprioceptive exercises and dynamic resisted strengthening exercises of the neck & shoulder musculature for chronic or frequent neck disorders. The active range of motion exercises is also conducted to improve the function of vertebrae⁽⁹²⁾. The stretching exercises also have importance in managing the chronic neck pain. A similar study conducted by Evans R et al in 2002 for the comparison of the effects of spinal manipulation with rehabilitative exercise in which the Med-X rehabilitative exercise or spinal manipulation

alone. Results explain that spinal manipulation along with exercise group was far more better than other group in respect to strength and range of motion ⁽⁹³⁾.

Manual therapy and exercise was clearly more effective in managing neck pain and disability. It is more safe treatment approach for patients with mechanical neck pain⁽⁸⁵⁾. This research article describes the soft tissue mobilization in detail. The tension of the muscle usually decreases after the restoration of joint muscle but in some cases the spasm continues. This study showed that both interventions are effective in the treatment of chronic non-specific neck pain however; isometric exercises results are clinically more significant than general exercises.

Above mentioned studies support our research result which clearly state that only exercise therapy has no significant difference in improving pain and neck disability function of patients with chronic neck pain. The reason could be due to the noncompliance of patients or due to less effectiveness of a single intervention given to patients with chronic neck pain. A Home-exercise program was developed to provide a structured way of performing exercises at home or at patient's work station to benefit in long-term goal from chronic neck pain. Total of seven full text articles met the inclusion criteria, they found that HEP which aim for strength training and improving endurance have long-term beneficial effects at reducing neck pain, function, and disability and improving Quality of Life of a patient⁽¹⁰¹⁾.

Hence, after finding many researches we can draw our conclusion that manual therapy with joint mobilization and exercise therapy shows much efficacy in long term as compared to exercise therapy. But we can also say that home-exercise program and postural education has its own beneficial effects to reduce neck pain disability and can prevent re-occurrence. Therefore, we can conclude that both the therapies are effective with no such dominance over the other but there is a statistically significant difference.

Conclusion: This study shows significant difference between manual therapy as well as exercise therapy in the management of chronic neck pain. Both manual therapy and exercise therapy along with other techniques can improve pain and neck disability in patients with chronic neck pain. On closer observation, the manual therapy with joint mobilization, soft tissue mobilization and exercise program along with postural correction education and home exercise plan appeared as a favorable treatment preference compared with exercise therapy alone. But, none of the intervention is significantly effective over other after 8th week of treatment. The reason behind this may be the short duration of the study that is showing insignificance. Furthermore, more studies are required for more evaluation of significant efficacy.

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