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Effect of Four Weeks Manual Therapy Exercises on Pain and Functional Disability in Young Adult Population with Chronic Non-Specific Neck Pain - An Experimental Study

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ABSTRACT

Background: Chronic non-specific neck pain is a prevalent condition affecting young adults, particularly those engaged in occupations involving prolonged sitting, poor posture, and repetitive strain. This condition can lead to significant pain, functional disability, and decreased quality of life, ultimately impacting productivity and overall well-being.
Methodology: This randomized controlled trial included 40 young adults with chronic non-specific neck pain, randomly assigned to either a manual therapy group (n=20) or a therapeutic exercise group (n=20). The manual therapy group received cervical soft tissue facilitated positional release and suboccipital muscle inhibition with scalene stretch. The therapeutic exercise group received isometric neck exercises, chin tuck exercises, and eccentric exercises for neck extensors, both groups receiving treatment for 4 weeks, 5 days a week. Outcome measures included pain intensity (VAS) and functional disability (NDI).
Results: Mean age of participants of group A and B were 21.55± 3.36 and 20.15±1.46 years respectively. Group A participants showed marked improvement at VAS and NDI outcome measurement compared to group B.
Conclusion: In conclusion, this study provides evidence that both manual therapy and therapeutic exercises are effective treatments for reducing pain and disability in patients with chronic non-specific neck pain. Notably, the findings suggest that manual therapy may have a greater impact on reducing disability, as evidenced by greater improvements in NDI scores. These results have important implications for the development of targeted treatment protocols for patients with chronic non-specific neck pain.

Keywords: Chronic non-specific neck pain, Manual therapy

INTRODUCTION

The neck is a complex anatomical structure connecting the head to the torso, facilitating a wide range of movements[1,2]. Prolonged sitting is a significant risk factor, with workers who sit for >95% of their worktime being twice as likely to experience neck pain[3]. Chronic neck pain is common, with 67% of individuals likely to experience it at some point in their lives.

Neck pain often arises from poor ergonomics and posture, static positions, stress, and

repetitive movements[4]. Prolonged activities like sitting, driving, or reading can also contribute to neck pain[5]. However, in some cases, no specific cause of pain can be identified, and the condition is then referred to as non-specific neck pain[6].

Non-specific neck pain refers to pain in the neck and surrounding areas without a specific identifiable cause, such as trauma or systemic pathology[7]. It's characterized by pain in the cervical and shoulder regions, potentially radiating down the arm, and decreased range of motion[8].

Young adulthood is a critical period for developing musculoskeletal neck pain, which can impact future health and reduce work productivity[9]. The increasing use of smartphones and computers among adolescents and young adults contributes to the rising incidence of neck pain due to prolonged poor posture and repetitive strain on neck muscles[10].

Conservative treatments like manual therapy, exercise, acupuncture, and medical care can effectively manage chronic non-specific neck pain[11]. Manual therapy involves hands-on techniques, such as mobilization and manipulation, to improve joint function, range of motion, and reduce symptoms. It's often used to treat neck pain without underlying serious conditions[12].

Many young adults experience chronic neck pain due to habitual postures. Research has shown that manual therapy can be an effective treatment, but there's limited information on its specific benefits for young adults. This study aims to investigate the clinical effects of manual therapy on nonspecific neck pain in young adults.

MATERIALS & METHODS

MATERIALS

1. Data collection form/consent form
2. Pen
3. Paper
4. Plinth
5. Chair
6. Postural mirror

PROCEDURE

- After obtaining Institutional Ethical Committee clearance, subjects were selected based on inclusion criteria, which included age 18-30 years, both male and female, pain at the lateral and posterior aspect of the neck, unilateral and/or bilateral pain, neck pain lasting 6-12 weeks, and a VAS score ≥ 3 and ≤ 6, and exclusion criteria, which included irradiated neck pain, neck pain associated with vertigo and migraine, vertebral fracture, diagnosed psychological disorder, and recent neck surgery.
- Informed about the study procedure and provided written consent before being tested for chronic nonspecific pain by NDI and VAS.
- Subjects underwent NDI and VAS before and after the study, and were conveniently divided into two groups: Group A (Manual therapy) and Group B (Control group), receiving interventions for five consecutive days, one session daily for four weeks.

GROUP A: MANUAL THERAPY[13]

1. CERVICAL SOFT TISSUE

FASCILITATED POSITIONAL RELEASE [15 REPETITION]

The therapist positions the patient in supine and sits at the head of the table, palpating paraspinal tension with one hand while holding the head with the other. The neck is slowly flexed to reduce lordosis, then side-bent and rotated towards the tension until it decreases, followed by slight extension to

further reduce tension, holding for 5-7 seconds before slowly returning to neutral.

2. SUBOCCIPITAL MUSCLE INHIBITION [5 REPETITION]

The therapist places both hands under the patient's head, applying gentle pressure with fingers on the occipital bone, and maintains constant, painless pressure for 3 minutes to relax the suboccipital muscles and relieve tension.

3. SCALANE STRETCH [15REPETITION]

This describes a self-stretching technique for the scalene muscles. The patient sits while the therapist supports the head, allowing it to gently side-bend away from the tight muscle, holding the stretch for 15 seconds with deep breaths.

GROUP B: CONTROL GROUP (THERAPEUTIC EXERCISE)[14,15,16]

1.CHIN TUCK

The patient performs a chin tuck exercise in a sitting position, doing 3 sets of 10 repetitions. This exercise helps improve posture and reduce neck strain by strengthening deep cervical flexors.

2.ISOMETRIC NECK EXERCISE

The patient, in a sitting position, performs co-contraction exercises for neck muscles (flexors, extensors, and lateral rotators). The therapist provides resistance in the opposite direction while the patient attempts movement, holding for 3 seconds, and repeating for 10 repetitions. This exercise helps strengthen and stabilize the neck muscles.

3.ECCENTRIC FOR EXTENSORS

The patient, in a sitting position, performs cervical flexion exercises, completing 4 sets of 20 repetitions. This exercise targets the deep cervical flexor muscles, helping improve neck mobility and strength.

OUTCOME MEASURES

- **VISUAL ANALOGUE SCALE [ICC=0.95-0.98][17]**

Visual analog scale for pain. The subjects participating in the study indicated the intensity of their pain by means of the VAS of 100 mm; they had to signal in a horizontal line of 100 mm where they would place their pain, being 0 mm "no pain" and the 100 mm "the worst pain imaginable.

- **NECK DISABILITY INDEX [ICC=0.50-0.98%][18]**

The NDI is a self-assessment instrument of the specific functional status of subjects with neck pain with 10 elements that include pain, personal care, weight gain, reading, headache, concentration, work, driving, sleeping, and leisure. Each section is rated on a scale of 0 to 5, where 0 means "painless" and 5 means "the worst pain imaginable." The points obtained are added to a total score. The questionnaire was interpreted as a per-centage. The disability categories for NDI are 0–8%, without disability; 10–28%, mild; 30–48%, moderate; 50–64%, severe; and 70–100%, complete

STATISTICAL ANALYSIS

Statistical analysis was done using SPSS version 16. The Shapiro-Wilk test showed non-normal data distribution, so non-parametric tests were used. The Wilcoxon signed-rank test compared pre- and post-intervention outcomes within groups, while the Mann-Whitney U test compared outcomes between Manual and control groups.

RESULT

After conducting 56 evaluations, 50 subjects started the study, in which completed 40 subjects. While follow-up dropout subjects were 5 in Group A manual therapy group and 5 in Group B control group respectively.

Participants' baseline characteristics are presented in Table 1. That Shows the mean and standard deviations. Baseline data comparison pre intervention presented in Table 2, The Mann-Whitney U test was used to compare the baseline pre intervention values in both groups. For intergroup analysis, The Wilcoxon signed-rank test was used to compare the pre- and post-intervention outcomes of VAS and NDI within the group which is presented in Table 3. The Mann-Whitney U test was used to compare the post intervention VAS and NDI between manual and control groups which is presented in Table 4.

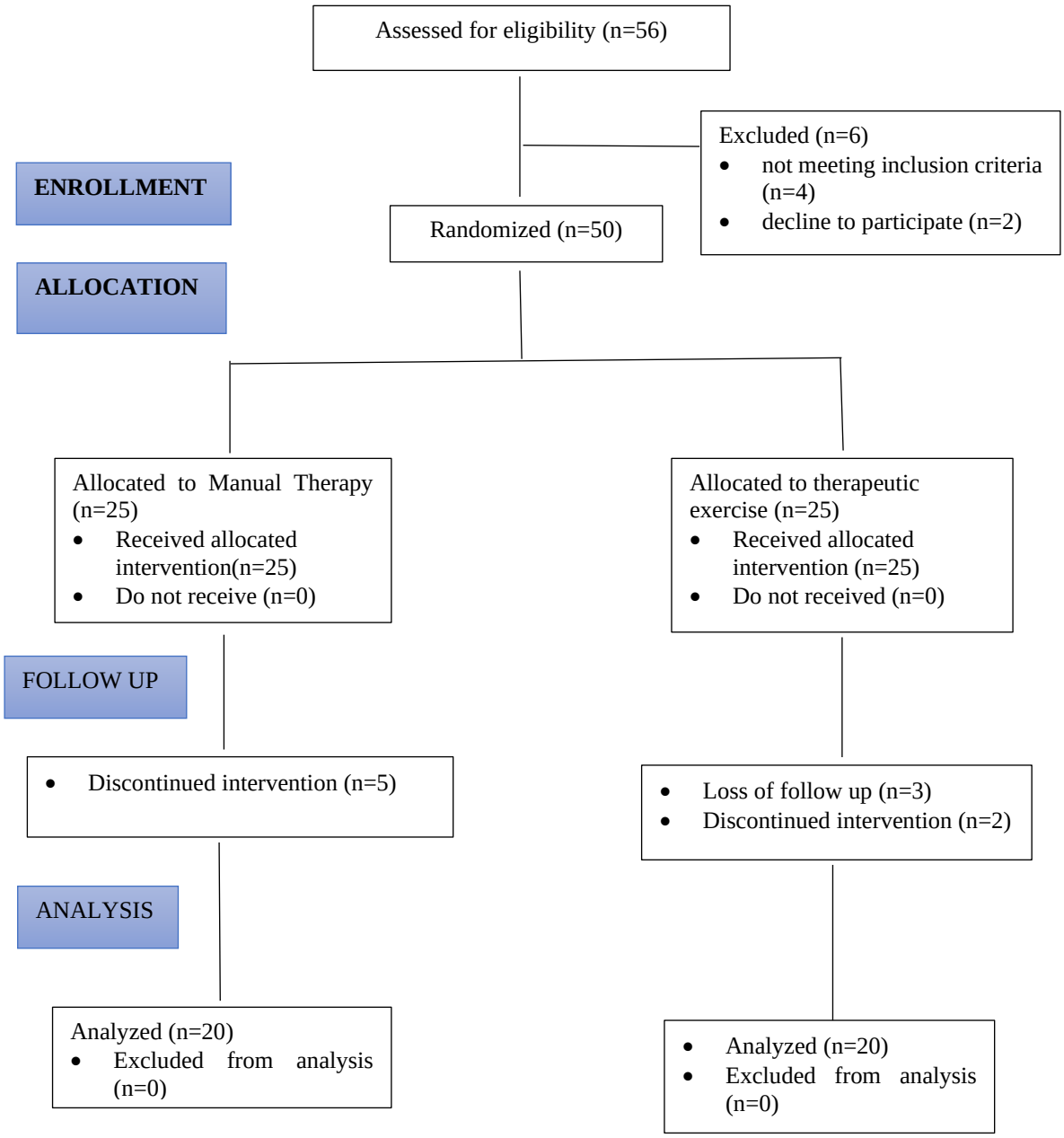


FIG.1 CONSORT FLOW DIAGRAM

TABLE 1: BASELINE DATA COMPARISON

VARIABLES	GROUP A MEAN±SD	GROUP B MEAN±SD
AGE	21.55± 3.36	20.15± 1.46
GENDER	1.85± 0.366	1.65 ± 0.48
SIDE (UNILATERAL AND/OR BILATERAL)	2.00± 0.00	1.80 ± 0.41
DURATION (≥6 MONTHS)	9.45± 1.82	8.70 ± 1.63

TABLE 2: BASELINE DATA COMPARISON PRE-INTERVENTION

VARIABLE	GROUP A MEAN ± SD	GROUP B MEAN ± SD	U VALUE	P VALUE
VAS	4.19±1.05	4.03±0.71	185.00	0.69
NDI	10.05±2.70	9.45 ±2.50	178.00	0.56

TABLE 3: WITHIN GROUP COMPARISON OF VAS

OUTCOME	GROUPS	PRE/POST	MEAN±SD	Z VALUE	P VALUE
VAS	MANUAL	PRE	4.19±1.05	3.922	0.001
		POST	0.48±0.33		
	CONTROL	PRE	4.03±0.71	3.925	0.001
		POST	0.41±0.01		

TABLE 4: WITHIN GROUP COMPARISON OF NDI

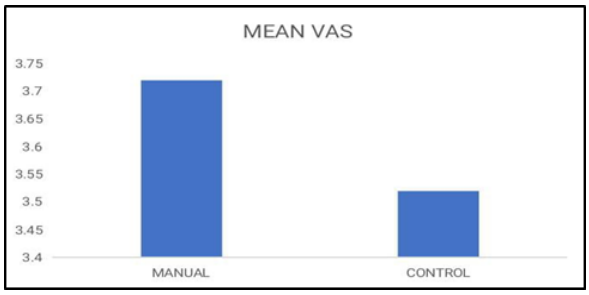
OUTCOME	GROUPS	PRE/POST	MEAN±SD	Z VALUE	P VALUE
NDI	MANUAL	PRE	10.05±2.73	3.96	0.001
		POST	2.38±1.47		
	CONTROL	PRE	4.45±2.50	3.94	0.001
		POST	4.40±0.50		

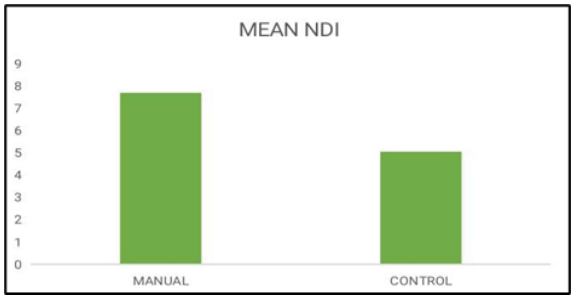
TABLE 5: BETWEEN GROUP COMPARISON OF MEAN DIFFERENCE FOR VAS

OUTCOME	GROUP A MANUAL	GROUP B CONTROL	U VALUE	P VALUE	Cohn's d
VAS	3.72±0.62	3.62±0.39	4.00	0.001	0.4

TABLE 6: BETWEEN GROUP COMPARISON OF MEAN DIFFERENCE FOR NDI

OUTCOME	GROUP A MANUAL	GROUP B CONTROL	U VALUE	P VALUE	Cohn's d
NDI	8.12±1.7	5.05±1.00	120.00	0. 005	1.9





The results of the study revealed that manual therapy exercises as well as therapeutic exercises has extremely significant effect on VAS and NDI but Manual therapy Technique group showed decreases in NDI mean ranks, indicating better improvement.

DISCUSSION

This review examines the efficacy of manual therapy for chronic non-specific neck pain, analysing evidence from RCTs with 40 participants, using VAS for pain intensity and NDI for disability assessment.

Both manual therapy and therapeutic exercise reduced pain and disability in neck pain patients. However, manual therapy showed greater improvement in disability, likely due to its targeted approach addressing specific affected areas in the neck.

The study found that certain subgroups, such as active drivers and students with prolonged reading habits, didn't achieve full recovery due to daily activities exacerbating musculoskeletal strain. This highlights the need for tailored treatment plans considering individual circumstances.

The study showed significant improvement in Neck Disability Index (NDI) after four weeks of manual therapy treatment. Manual therapy techniques likely contributed to this improvement by restoring joint mobility, reducing muscle spasm and tension, and promoting relaxation and pain relief[19].

Therapeutic exercise showed benefits, particularly in pain reduction (VAS score), but manual therapy had better results in improving disability (NDI). This suggests that therapeutic exercise may be more effective for pain management, while manual

therapy may be better suited for improving functional ability. Therapeutic exercises, such as strengthening, stretching, and proprioception exercises, help reduce disability by addressing musculoskeletal dysfunction. They improve joint mobility, range of motion, and movement patterns, ultimately enhancing functional ability and quality of life[20].

The study had several limitations, including a small sample size and limited follow-up period. Future studies should aim to recruit larger samples and follow patients for longer periods to determine the long-term effects of treatment. Additionally, future studies should aim to elucidate the mechanisms underlying the treatment effects observed in the study.

CONCLUSION

In conclusion, the study provides evidence that manual therapy and therapeutic exercises are effective treatments for reducing pain and disability in patients with chronic non-specific neck pain. The findings suggest that manual therapy may be more effective in addressing disability, while therapeutic exercises may be more effective in reducing pain symptoms.

Declaration by Authors

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