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EFFECTS OF MANUAL THERAPY ALONE AND IN COMBINATION WITH THERAPEUTIC ULTRASOUND AMONG FEAMLE PATIENTS WITH CARPAL TUNNEL SYNDROME.

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ABSTRACT

BACKGROUND: Carpal tunnel syndrome (CTS) is a common disorder that affects the median nerve in the wrist, leading to pain, numbness, and weakness in the hand. It is a typical occupational disorder that affects people who use vibrating tools or equipment or engage in repetitive hand motions. **OBJECTIVE:** To determine the effects of manual therapy alone and in combination with therapeutic ultrasound among female patients with carpal tunnel syndrome. **MATERIALS AND METHODS**: 50 female patients were chosen for the study from a variety of clinics in Pakistan's Twin Cities. The 25 female patients in experimental group were treated with manual therapy plus ultrasound therapy, and 25 female patients of control group were treated with manual therapy only. Every session began with an evaluation of each patient's symptom improvement. Data were gathered using a functional status measure for physical functions and a numeric pain rating scale. Data analysis was done using SPSS 22. **RESULTS:** This study included 50 participants, 25 in each group, with mean ages of 42.24±2.76 years and 45.88±2.01 years in the experimental and control groups, respectively. The mean BMI was 26.9 in the experimental group and 25.5 in the control group. Both groups' participants tended to be right-handed, and the majority of them had carpal tunnel symptoms that mostly affected the right hand. Both manual therapy techniques with and without therapeutic ultrasound were found effective in reducing pain and improving functional status in patients with carpal tunnel syndrome. In comparison to the control group, the experimental group displayed a statistically significant reduction in pain score and an improvement in functional status. Between the two groups, there was a mean difference in pain reduction of 2.58 0.11, and the mean. **CONCLUSION:** Study concluded that manual therapy techniques along with ultra sound therapy were very effective combination in the management of chronic carpal tunnel syndrome in female patients. But experimental group is more effective than control group.

KEY WORDS*:* Females, Carpal tunnel syndrome, Manual therapy, Ultrasound Therapy.

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INTRODUCTION

Compression of median nerve is most commonly affected nerve disorder which is called carpal tunnel syndrome[1]. It is one of the most common condition involving wrist pain, numbness, and paraesthesia in the hand. Most commonly affected occupations are hair dressers, knitters and sweepers which involves repetitive task related functions. Carpal tunnel syndrome trouble overall 5% of the population with female's patients affected more than males[2]. Worldwide prevalence of carpal tunnel syndrome is 3.8% in general population and in South Korea 6.3% [3]. Prevalence of carpal tunnel syndrome is higher in Asian countries compared to European countries[4].

Prevalence of 7.8% of carpal tunnel syndrome is found to be more in urban working areas of china[5]. Turkish reports that Prevalence of carpal tunnel syndrome 7.5% in female workers[6]. Compared to Asian countries, studies conducted in Europe that there is low prevalence of carpal tunnel syndrome. Denmark reports 2.7% in general population[7] and Italy reports 3.2%[8]. Major factors including a greater incidence of diabetes mellitus, obesity, and manual labor employment, may contribute to the increased frequency of Carpal tunnel syndrome in Asian nations. Diabetes mellitus has been identified as a risk factor for CTS, and Asian countries have a greater frequency of the disease as compared to European nation's do[9]. Obesity considered linked to a higher risk of Carpal tunnel syndrome, Asian nations also have higher prevalence of obesity[10]. Manual labor occupations involve repetitive wrist and hand movements that have been connected to Carpal tunnel syndrome risk factors, and these occupations are more common in Asian countries than in European countries[11]. Physiotherapy is one of the most useful treatments for carpal tunnel syndrome and is typically utilized to control the condition[12]. Two physical therapy treatments that have been utilized to treat Carpal tunnel syndrome include manual therapy and therapeutic ultrasound. In manual treatment, the afflicted region is manipulated, or massaged using hands-on approaches. On the other side, therapeutic ultrasound employs high-frequency sound waves to generate heat and encourage tissue

repair. Both treatments have been proven to be successful in lowering pain and enhancing hand function in Carpal tunnel syndrome patients[13, 14]. Despite the popularity of these modalities, there is still a lack of consensus on their effectiveness when used alone or in combination. Some studies have reported better outcomes with the combined use of manual therapy and therapeutic ultrasound, while others have found no significant difference between the two modalities[15].

Therefore, the aim of this study is to investigate the effects of manual therapy alone and in combination with therapeutic ultrasound on pain, functional status among female patients with CTS.

MATERIALS AND METHODS

This RCT was carried out in Pakistan's twin cities from January 2022 to June 2022. Software OPEN EPI 3.0 version was used to calculate the sample size which anticipated a sample size of 50 with the 5% margin of error and 95% confidence level. The study includes female patients with complain of carpal tunnel syndrome. Age group of patients was between 25 to 45 years. Phallens test was used to evaluate the patients. Patients having numbness and weakness carried by other conditions such as cervical compression, wrist or forearm fractures, wrist drop, or any other trauma were eradicated. Carpal tunnel syndrome patients' information on their pain and functional status was gathered. There were two groups equally divided into Experimental and control respectively. 25 female's patients were in each group. The questionnaire was used to gather information on demographics, the Numeric Pain Rating Scale (NPRS) for pain, and the functional level as determined by the functional status scale. Standard agreement form was used to obtain from participants. Throughout the whole study, anonymity and confidentiality were maintained. SPSS version 22 was used to analyses the data. Within two groups, the statistical Mann-Whitney test was applied to evaluate the efficacy of the therapies.

RESULTS

In these RCT 25 patients in each group with the average age of experimental group was 42.24± 2.76 years as compare to control group age was 45.88± 2.01 years. The Mean body mass index of experimental group was 26.9 and 25.5 in control group. Most of the participants were right handed with 88% and 96 % respectively.84% patients in experimental group have complain of Right hand and 16% in control group. 92% patients in control group have complained in right hand and 8% in left hand. In terms of the number of carpal tunnels affected, the majority of participants in both groups had symptoms affecting one carpal tunnel. In the experimental group, 76% of participants had symptoms affecting one carpal tunnel, while 24% had symptoms affecting both carpal tunnels. In the control group, 80% of participants had symptoms affecting one carpal tunnel, while 20% had symptoms affecting both carpal tunnels.

Table 1: The mean values for participant characteristics at baseline for each group and provides comparisons between the groups

	Experimental Group(n = 25)	Control Group (n = 25)
Age (Mean, SD)	42.24±2.76	45.88±2.01
BMI (Mean)	26.9	25.5
Dominant hand: right (%), left (%)	22 (88); 3 (12)	24 (96); 1 (4)
Asymptomatic hand: right (%), left (%)	2 (8); 23 (92)	5 (20); 20 (80)
Symptomatic hand: right (%); left (%)	21 (84); 4(28)	23 (92); 2(8)
Number of carpal tunnels 1/2 (%)	19 (76); 6(24)	20 (80); 5(20)

Table 3. Means, standard deviations, and ranges for the pain score and functional status scale in the experimental and control groups, as well as the between-group and within-group comparisons.

Examination	Treatment	Experimental group	Control Group	Mean Difference
Pain	Pre	5.72 ± 1.49	5.25 ± 1.75	0.47±0.26
	Post	1.47 ± 1.20	3.58 ± 1.93	2.11± 0.73
	Mean different	4.25±0.29	1.67± -0.18	2.58±0.11
Functional Status Scale	Pre	3.02 ± 0.94	2.97 ± 0.96	0.05±0.02
	Post	1.98 ± 0.61	2.41 ± 0.92	-0.43±-0.32
	Mean Difference	1.04±0.33	0.56±0.04	0.48±0.29

The results showed that both manual therapy techniques with and without therapeutic ultrasound were effective in reducing pain and improving functional status in patients with carpal tunnel syndrome. The mean pain score in the experimental group decreased significantly from 5.72 ± 1.49 to 1.47 ± 1.20 (mean difference = 4.25±0.29) after treatment, while in the control group, the mean pain score decreased from 5.25 ± 1.75 to 3.58 ± 1.93 (mean difference = 1.67± -0.18). The mean difference between the two groups was 2.58±0.11, indicating a statistically significant difference in pain reduction between the two groups in favor of the experimental group.

Similarly, the functional status scale score improved significantly in the experimental group from 3.02 ± 0.94 to 1.98 ± 0.61 (mean difference = 1.04±0.33), while in the control group, the score improved from 2.97 ± 0.96 to 2.41 ± 0.92 (mean difference = 0.56±0.04). The mean difference between the two groups was 0.48±0.29, indicating a statistically significant difference in functional status improvement between the two groups in favor of the experimental group.

DISCUSSION

The objective of the study was to ascertain if manual therapy procedures both with and without therapeutic ultrasound can aid in the pain management and functional improvement of individuals with carpal tunnel syndrome. The results showed that both manual therapy modalities were effective in reducing pain carpal tunnel syndrome and improving their functions. The experimental group, which received manual therapy along with therapeutic ultrasound, experienced a statistically significant improvement in both pain and functional status in comparison to the control group, which received only manual treatment. The outcomes of this study are consistent with previous studies, which demonstrated that manual therapy can help carpal tunnel syndrome patients [16] by reducing discomfort and improving function. Moreover, it has been shown that patients with carpal tunnel syndrome can function better and have less discomfort when therapeutic ultrasound and manual treatment are combined[17].

Although the underlying mechanism of manual therapy's skill to increase function and lessen discomfort in those with carpal tunnel syndrome is still idiopathic. Manual therapy techniques such as soft tissue mobilization and joint mobilization may relieve the mechanical strain on the median nerve, lowering discomfort and improving function[18]. The findings of this study suggested that manual treatment techniques,

whether used in combination with or without therapeutic ultrasound, may be beneficial for people with carpal tunnel syndrome. However, further research is needed to compare the efficacy of these therapies to other types of treatment and to look at the long-term effects of these interventions.

CONCLUSION

Manual therapy treatment methods both, with and without therapeutic ultrasound considered effective for the treatment of carpal tunnel syndrome patients improving their functions and reducing discomfort. Comparatively experimental group is found to be more effective than control group.

ETHICS APPROVAL: The ERC gave ethical review approval.

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin.

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