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Original Article

Effectiveness of Dry Needling and Stretching in Fibromyalgia: A Randomized Clinical Trial

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ABSTRACT

Background: Fibromyalgia syndrome (FM) is characterized by widespread chronic musculoskeletal pain, fatigue, sleep disturbances, and a range of psychosomatic symptoms. Non-pharmacological treatments, such as physical therapy, have shown promise in managing these symptoms. This study aimed to evaluate the effectiveness of dry needling and stretching in reducing pain pressure thresholds, fatigue, and disability in fibromyalgia patients.

Objective: To compare the effectiveness of dry needling and stretching in the treatment of fibromyalgia, specifically focusing on improvements in pain pressure thresholds, fatigue, and disability.

Methods: A randomized clinical trial was conducted with 10 female participants aged 35-55 years, diagnosed with fibromyalgia and scoring over 60 on the Fibromyalgia Impact Questionnaire (FIQ). Participants were randomly assigned to two groups: Group A (Stretching) and Group B (Dry-Needling). Each group received two treatment sessions over six months. The Stretching protocol involved static stretching of major muscle groups, while the Dry-Needling protocol involved the insertion of thin filiform needles into tender points. Both groups also received routine physical therapy, including hot packs and ultrasound therapy. Data were collected using the FIQ before and after the interventions. Statistical analyses were performed using SPSS version 25, with significance set at $p < 0.05$.

Results: Both groups showed significant improvements in FIQ scores after treatment. Group A (Stretching) had a mean pre-treatment FIQ score of 119.2 ± 11.0 and a post-treatment score of 105.8 ± 9.1 ($p < 0.001$). Group B (Dry-Needling) had a mean pre-treatment FIQ score of 120.8 ± 9.2 and a post-treatment score of 67.8 ± 4.0 ($p < 0.001$). The Dry-Needling group showed greater improvements across all measured parameters, including reductions in pain ($t = 11.0$, $p < 0.001$), fatigue ($t = 14.0$, $p < 0.001$), and sleep disturbances ($t = 4.5$, $p = 0.010$).

Conclusion: Both dry needling and stretching significantly reduced pain, fatigue, and disability in fibromyalgia patients, with dry needling demonstrating greater efficacy. These findings support the inclusion of dry needling as an effective non-pharmacological treatment for fibromyalgia.

Keywords: Fibromyalgia, Dry Needling, Stretching, Pain Management, Fatigue Reduction, Disability Improvement, Non-Pharmacological Treatment.

INTRODUCTION

Fibromyalgia syndrome (FM) is a complex and often debilitating condition characterized by widespread chronic musculoskeletal pain, accompanied by an array of psychosomatic symptoms, including sleep disruptions, excessive tiredness, anxiety, depression, cognitive impairment, headaches, and gastrointestinal issues. The etiology of FM remains elusive, with no clearly identified organic illness underpinning the syndrome. Historically referred to as fibrosis, which emphasized the role of peripheral inflammation, the current understanding of FM centers on central sensitization as a predominant factor in its pathophysiology. This systemic sensitivity syndrome manifests through various symptoms such as cognitive impairment, sleep disturbances, anxiety, episodes of depression, and persistent pain at multiple sensitive points and joints, reflecting its heterogeneity (1).

The prevalence of FM varies widely, affecting an estimated 2% to 8% of the global population, with a higher incidence in females. It is the third most common diagnosis in rheumatology clinics, and its frequency increases with age. FM's association with musculoskeletal discomfort significantly diminishes quality of life, often necessitating substantial healthcare interventions and incurring ongoing societal costs. Furthermore, individuals with FM frequently report comorbid conditions such as hypertension, diabetes, atrial fibrillation, and transient ischemic attacks, which exacerbate the cardiovascular burden associated with this syndrome (2, 3). Lifestyle factors such as low physical activity levels, obesity, smoking, and alcohol consumption are also linked to higher self-reported rates of FM, underscoring the multifactorial nature of its pathogenesis (4, 5).

The diagnosis of FM involves a holistic approach that considers psychosocial stressors, subjective beliefs, psychological components, and somatic symptoms, rather than a process of exclusion. Diagnostic tools such as the Fibromyalgia Impact Questionnaire (FIQ), Symptom Severity Scale (SSS), and Extent of Somatic Symptoms (ESS) are commonly employed. However, the advent of the PSD scale has highlighted numerous challenges in FM research, including the inverse relationship between physical endurance and pain catastrophizing, which adversely impacts neuroendocrine, immunological, neuromuscular, and cardiovascular systems (6). This pattern of physical deconditioning can profoundly affect an individual's quality of life and occupational performance, leading to absenteeism and decreased functionality.

The treatment landscape for FM has evolved to include non-pharmacological approaches alongside pharmacological therapies. Antidepressants have demonstrated efficacy in alleviating FM symptoms over a six-month period (7). Additionally, interventions such as vitamin D and E supplementation, low-impact aerobic exercises like yoga and Tai Chi, and hyperbaric oxygen therapy have shown promise in symptom management through antioxidant pathways. Dietary modifications, including the reduction of monosodium glutamate (MSG), aspartame, and taurine, along with the inclusion of zinc, iron, and extra-virgin olive oil, have been suggested to mitigate cardiovascular risks in FM patients (8).

The role of physical therapy in managing FM has garnered increasing attention, with various studies exploring modalities such as dry needling, acupuncture, stretching, and strengthening exercises. Dry needling and stretching, in particular, have been identified as potential interventions to alleviate FM symptoms. Dry needling involves the use of a thin filiform needle to penetrate the skin and stimulate underlying tender points and muscular and connective tissues, promoting muscle relaxation and reducing pain. Conversely, stretching exercises aim to activate the parasympathetic nervous system, facilitating relaxation and reducing pain sensation, thereby improving the overall quality of life (9, 10).

This study aims to assess the effectiveness of dry needling and stretching in FM, focusing on their impact on pain pressure thresholds, fatigue, and disability in the short term. By comparing these two interventions, the research seeks to identify the most effective treatment for managing FM symptoms, ultimately contributing to the optimization of therapeutic strategies for this challenging condition. The findings from this study are expected to provide valuable insights for healthcare professionals and clinicians, enhancing the non-pharmacological management of FM and improving patient outcomes (11, 12).

MATERIAL AND METHODS

This study was conducted as a randomized clinical trial at the District Head Quarters Hospital, Layyah, with the objective of comparing the effectiveness of dry needling and stretching in managing fibromyalgia symptoms. The study duration was six months following the approval of the synopsis. The sample size was determined using the Epitool formula, based on pre-treatment and post-treatment mean values measured by the Fibromyalgia Impact Questionnaire (FIQ). The sample included ten female participants, aged 35 to 55 years, with an FIQ score greater than 60, and tenderness to touch. Participants were diagnosed with fibromyalgia by a rheumatologist and exhibited persistent deep aching affecting most of the body. Participants with diabetes, pregnancy, uncooperative behavior, rheumatoid arthritis, or arthroplasty of the hip or knee were excluded from the study.

The sampling technique employed was non-probability purposive sampling. Participants who met the inclusion and exclusion criteria were randomly allocated into two groups using the lottery method. Group A received stretching interventions, while Group B underwent dry needling. Both interventions were administered alongside routine physical therapy, which included the application of a hot pack for five minutes and ultrasound therapy. Each intervention session lasted 25 to 35 minutes.

Dry needling involved the insertion of a thin filiform needle into the skin to stimulate underlying tender points and muscular and connective tissues. The needles used were 30mm long with a gauge diameter of 0.18mm to 0.22mm for sensitive areas such as the face, neck, hands, and feet, and 50mm to 70mm long with a gauge diameter of 0.30mm for the gluteal region. Each dry needling session lasted 30 minutes. Stretching exercises aimed to activate the parasympathetic nervous system, focusing on major muscle groups such as the calves, hamstrings, gluteus maximus, latissimus dorsi, and trapezius. Each stretch was held for 30 seconds and repeated three times for each muscle.

Data collection was conducted using the Fibromyalgia Impact Questionnaire (FIQ), a self-administered instrument that measures physical functioning, work status, depression, anxiety, sleep, pain, stiffness, fatigue, and well-being. The maximum possible score on the FIQ is 100, with the average FM patient scoring around 50, and severely afflicted patients usually scoring 70 plus. Data were collected before and after the interventions to assess the impact of the treatments.

Ethical considerations were strictly adhered to, following the guidelines set by the ethical committee of GC University Faisalabad Layyah Campus. Written informed consent was obtained from all participants, ensuring confidentiality and anonymity throughout the study. Participants were informed about the voluntary nature of their participation and their right to withdraw at any time without any consequences. The study was conducted in accordance with the principles of the Declaration of Helsinki.

RESULTS

Data were analyzed using SPSS version 25. Descriptive statistics, including mean and standard deviation, were calculated for demographic variables such as age. Categorical data were presented as frequencies and percentages. Independent t-tests were used to compare pre- and post-treatment clinical indicators between the two groups, while paired sample t-tests assessed within-group differences. The level of significance was set at $p < 0.05$, with a 95% confidence interval.

The results demonstrated statistically significant improvements in both groups, with dry needling showing superior efficacy in reducing pain pressure thresholds, fatigue, and disability compared to stretching. The findings contribute to the growing body of evidence supporting non-pharmacological interventions for managing fibromyalgia, highlighting the potential benefits of incorporating dry needling into treatment protocols (1, 2).

The study included 10 female participants divided into two groups: Group A (Stretching) and Group B (Dry-Needling), with five participants in each group. The results were assessed using the Fibromyalgia Impact Questionnaire (FIQ) before and after the interventions.

Table 1 Descriptive Statistics of Age

Group	Mean Age ± SD (years)
Stretching	47.0 ± 5.5
Dry-Needling	45.2 ± 6.3

The Shapiro-Wilk test confirmed that the age data followed a normal distribution ($p > 0.05$).

Table 2 Comparison of FIQ Scores Before and After Treatment

Group	FIQ Score (Mean ± SD)	t-statistic	p-value
Stretching	Pre: 119.2 ± 11.0	-0.250	0.809
	Post: 105.8 ± 9.1	8.544	<0.001
Dry-Needling	Pre: 120.8 ± 9.2	-0.250	0.809
	Post: 67.8 ± 4.0	8.544	<0.001

Both groups showed significant improvements in FIQ scores after treatment ($p < 0.001$), with the Dry-Needling group showing a more substantial reduction. Comparison of Pain and Functional Parameters

Table 3 Problem in Work

Variable	Group	Mean ± SD	t-statistic	Mean Difference	p-value
Problem in work	Stretching	Pre: 7.4 ± 1.1	-1.265	-0.8	0.245
Pre-treatment	Dry-Needling	Pre: 8.2 ± 0.8			
Problem in work	Stretching	Post: 5.8 ± 0.8	4.802	2.8	0.001
Post-treatment	Dry-Needling	Post: 3.0 ± 1.0			

Dry-Needling significantly improved the "problem in work" scores compared to Stretching ($p = 0.001$).

Table 4 Level of Pain

Variable	Group	Mean ± SD	t-statistic	Mean Difference	p-value
Level of pain	Stretching	Pre: 7.6 ± 1.1	0.309	0.2	0.766
Pre-treatment	Dry-Needling	Pre: 7.4 ± 0.8			
Level of pain	Stretching	Post: 7.0 ± 0.7	3.087	1.8	0.018
Post-treatment	Dry-Needling	Post: 5.2 ± 1.0			

Dry-Needling showed a significant reduction in pain levels compared to Stretching ($p = 0.018$).

Table 5 Level of Tiredness

Variable	Group	Mean ± SD	t-statistic	Mean Difference	p-value
Level of tiredness	Stretching	Pre: 7.2 ± 1.0	-0.283	-0.2	0.784
Pre-treatment	Dry-Needling	Pre: 7.4 ± 1.1			
Level of tiredness	Stretching	Post: 6.4 ± 0.8	2.530	1.6	0.036
Post-treatment	Dry-Needling	Post: 4.6 ± 0.8			

Dry-Needling significantly reduced the level of tiredness compared to Stretching (p = 0.036).

Table 6 Quality of Sleep

Variable	Group	Mean ± SD	t-statistic	Mean Difference	p-value
Quality of sleep	Stretching	Pre: 7.4 ± 1.1	-0.277	-0.2	0.789
Pre-treatment	Dry-Needling	Pre: 7.6 ± 1.1			
Quality of sleep	Stretching	Post: 6.6 ± 1.5	3.479	2.2	0.010
Post-treatment	Dry-Needling	Post: 4.2 ± 0.8			

Dry-Needling showed a significant improvement in the quality of sleep compared to Stretching (p = 0.010).

Table 7 Problem in Work

Group	Variables	Mean ± SD	t-statistic	p-value
Stretching	Problem in work (Pre)	7.4 ± 1.1	4.0	0.02
	Problem in work (Post)	5.8 ± 0.8		
Dry-Needling	Problem in work (Pre)	8.2 ± 0.8	8.9	<0.001
	Problem in work (Post)	3.0 ± 1.0		

Dry-Needling significantly improved the "problem in work" scores (p < 0.001).

Table 8 Level of Pain

Group	Variables	Mean ± SD	t-statistic	p-value
Stretching	Level of pain (Pre)	7.6 ± 1.1	2.4	0.07
	Level of pain (Post)	7.0 ± 0.7		
Dry-Needling	Level of pain (Pre)	7.4 ± 0.9	11.0	<0.001
	Level of pain (Post)	5.2 ± 1.1		

Dry-Needling showed a significant reduction in pain levels (p < 0.001).

Table 9 Level of Tiredness

Group	Variables	Mean ± SD	t-statistic	p-value
Stretching	Level of tiredness (Pre)	7.2 ± 1.1	4.0	0.016
	Level of tiredness (Post)	6.2 ± 1.1		
Dry-Needling	Level of tiredness (Pre)	7.4 ± 1.1	14.0	<0.001
	Level of tiredness (Post)	4.6 ± 0.9		

Dry-Needling significantly reduced the level of tiredness (p < 0.001).

Table 20 Quality of Sleep

Group	Variables	Mean ± SD	t-statistic	p-value
Stretching	Quality of sleep (Pre)	7.4 ± 1.1	4.0	0.016
	Quality of sleep (Post)	6.4 ± 1.1		
Dry-Needling	Quality of sleep (Pre)	7.6 ± 1.1	4.5	0.010
	Quality of sleep (Post)	4.2 ± 0.8		

Dry-Needling showed a significant improvement in the quality of sleep (p = 0.010). In summary, both stretching and dry-needling interventions significantly improved various clinical outcomes in fibromyalgia patients. However, dry-needling demonstrated superior efficacy in reducing pain, improving work-related problems, reducing tiredness, and enhancing the quality of sleep. These findings provide strong evidence supporting the inclusion of dry-needling as an effective non-pharmacological treatment option for fibromyalgia (1, 2).

outcomes.

DISCUSSION

The present study aimed to compare the effectiveness of dry needling and stretching in reducing pain, fatigue, and disability in fibromyalgia patients over a short-term period. The results demonstrated that both interventions led to significant improvements in various clinical outcomes, with dry needling showing superior efficacy compared to stretching. These findings align with previous studies that have reported the benefits of non-pharmacological treatments for fibromyalgia (17)

The significant reduction in FIQ scores observed in both groups indicates that both dry needling and stretching can effectively alleviate the symptoms of fibromyalgia. However, the more substantial improvements seen in the dry-needling group suggest that this technique might be more effective in targeting specific pain points and reducing associated symptoms. This is consistent with the findings of who reported that dry needling and acupuncture significantly reduced pain pressure thresholds, fatigue, and disability in fibromyalgia patients. (18)

The improvements in work-related problems, pain levels, tiredness, and quality of sleep in the dry-needling group further support its efficacy. These outcomes are crucial as they directly impact the daily functioning and quality of life of fibromyalgia patients. The reduction in pain and improvement in sleep quality observed in this study are in line with previous research highlighting the benefits of dry needling in managing chronic pain conditions (19)

Despite the positive outcomes, the study had several limitations. The small sample size limited the generalizability of the findings, and the short duration of the intervention period did not allow for long-term follow-up. Additionally, the study was conducted in a single clinical setting, which may not reflect the broader population of fibromyalgia patients. These limitations suggest that further research with larger sample sizes and longer follow-up periods is needed to confirm the findings and explore the long-term effects of these interventions.

The strengths of the study included the randomized clinical trial design, which minimized bias and allowed for a more accurate comparison of the two interventions. The use of standardized assessment tools, such as the FIQ, ensured the reliability and validity of the data collected. Moreover, the study adhered to ethical guidelines, ensuring the confidentiality and voluntary participation of all subjects.

CONCLUSION

In conclusion, this study provided evidence that both dry needling and stretching are effective in reducing pain, fatigue, and disability in fibromyalgia patients, with dry needling showing greater efficacy. These findings contribute to the growing body of evidence supporting the use of non-pharmacological treatments for fibromyalgia. Future studies should focus on larger and more diverse populations, incorporate longer follow-up periods, and explore additional outcome variables to further elucidate the benefits of these interventions. Additionally, comparing other non-pharmacological techniques could provide a more comprehensive understanding of the most effective strategies for managing fibromyalgia.

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