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EFFECTIVENESS OF CONVENTIONAL PHYSICAL THERAPY INTERVENTIONS WITH AND WITHOUT COGNITIVE BEHAVIOR THERAPY ON PAIN AND QUALITY OF LIFE IN FIBROMYALGIA PATIENT

Original Research

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ABSTRACT

Background: Fibromyalgia is a chronic pain disorder characterized by widespread musculoskeletal pain, fatigue, sleep disturbances, and cognitive dysfunction. It significantly impairs quality of life, and its complex pathophysiology involves central sensitization, neurochemical imbalances, and psychological factors. Conventional physical therapy is commonly used for symptom management, but integrating cognitive behavioral therapy (CBT) may enhance treatment outcomes. This study evaluates the effectiveness of physical therapy alone versus a combination of physical therapy and CBT in improving fibromyalgia symptoms and health-related quality of life.

Objective: To compare the effectiveness of conventional physical therapy with and without cognitive behavioral therapy in improving fibromyalgia symptoms and quality of life in adults diagnosed with fibromyalgia.

Methods: A single-masked randomized clinical trial was conducted at the Physical Therapy Department, Maryam Hospital, Burewala. A total of 66 participants aged 18 to 65 years with a confirmed fibromyalgia diagnosis were randomly assigned to two groups. The intervention group received both physical therapy and CBT, while the control group received only physical therapy. Exclusion criteria included other chronic pain conditions, severe psychiatric disorders, substance abuse, unstable medical conditions, and participation in another clinical trial within the past 30 days. Treatment was provided twice weekly for 12 weeks. Outcomes were measured using the Fibromyalgia Impact Questionnaire (FIQ) and the Short Form-36 (SF-36) at baseline, the 6th week, and the 12th week. Data analysis was performed using SPSS version 24, applying parametric tests with a significance level of $p \leq 0.05$.

Results: Baseline FIQ scores were comparable between the intervention (69.03 ± 6.34) and control (68.09 ± 5.49) groups ($p = 0.523$). Post-intervention, the intervention group showed a significant reduction in FIQ scores (18.94 ± 3.68) compared to the control group (48.03 ± 4.60) ($p = 0.001$). Similarly, pre-intervention SF-36 scores in the intervention (30.27 ± 3.44) and control (31.03 ± 3.34) groups were not significantly different ($p = 0.367$). However, post-treatment, the intervention group demonstrated a significantly higher improvement (76.33 ± 5.65) than the control group (50.61 ± 2.81) ($p = 0.001$). Cohen's d effect sizes for FIQ and SF-36 were 15.13 and 16.47, respectively, indicating a substantial treatment effect.

Conclusion: The combination of physical therapy and CBT resulted in significantly greater improvements in fibromyalgia symptoms and quality of life compared to physical therapy alone. The findings support a multidimensional treatment approach, emphasizing the integration of psychological interventions into conventional rehabilitation strategies for fibromyalgia management.

Keywords: Cognitive Behavioral Therapy, Fibromyalgia, Pain Management, Physical Therapy Modalities, Quality of Life, Rehabilitation, Randomized Controlled Trial.

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INTRODUCTION

Fibromyalgia is a complex and enigmatic condition characterized by chronic widespread pain, persistent fatigue, nonrestorative sleep disturbances, and significant psychological distress, impacting daily functioning and overall quality of life (1). It affects approximately 2–4% of the global population, with a disproportionately higher prevalence among women, comprising nearly 75–90% of diagnosed cases (2). The condition is notably less prevalent in Asian populations compared to Western nations, with epidemiological data suggesting that approximately 1–2% of the Japanese population and only 0.6–1% of Chinese individuals meet the diagnostic criteria (3). Despite ongoing research, the precise etiology remains unclear, though fibromyalgia is believed to arise from a multifaceted interplay of genetic predisposition, environmental triggers—including infections, physical trauma, and chronic stress—and underlying psychological conditions such as anxiety and depression. A key pathophysiological mechanism involves central sensitization, wherein the central nervous system exhibits heightened responsiveness to pain stimuli, leading to amplified pain perception and persistent discomfort. Additionally, neurochemical imbalances, hormonal dysregulation, and sleep disturbances further contribute to the chronicity of fibromyalgia symptoms (4). Clinically, fibromyalgia manifests with widespread musculoskeletal pain, profound fatigue, cognitive impairments—often termed “fibro fog”—and sleep disturbances. Many individuals also report heightened pain sensitivity, headaches, depression, and anxiety, further exacerbating disease burden (5). Diagnosis primarily relies on symptomatology, with the American College of Rheumatology’s 2010/2011 criteria emphasizing a history of widespread pain lasting at least three months, accompanied by symptoms such as cognitive dysfunction, fatigue, and nonrestorative sleep. The diagnostic approach also includes assessing symptom severity rather than relying solely on tender point evaluation, allowing for a more comprehensive assessment of disease impact (6-8).

Effective management of fibromyalgia remains a challenge, necessitating a multimodal approach. Conventional physical therapy is widely employed to enhance physical function, reduce pain, and improve quality of life through targeted exercises such as aerobic training, stretching, and strength conditioning (9-12). At a neurophysiological level, physical therapy modulates the central nervous system by mitigating the effects of central sensitization, facilitating neuroplasticity, and restoring neurotransmitter balance. Exercise-induced release of serotonin, norepinephrine, and endorphins plays a crucial role in reducing pain hypersensitivity, improving mood, and promoting overall well-being (13,14). Additionally, physical therapy increases blood circulation, enhances oxygen delivery to tissues, and reduces inflammatory markers, ultimately alleviating muscle stiffness and tension. Notably, structured exercise interventions promote cortical reorganization, positively influencing brain regions involved in pain modulation and emotional regulation (15). Moreover, adjunct therapies such as hydrotherapy and massage contribute to symptom relief by enhancing lymphatic circulation and facilitating tissue repair (16,17). Cognitive Behavioral Therapy (CBT) has emerged as an effective psychological intervention for fibromyalgia, focusing on restructuring maladaptive thought patterns, regulating emotional responses, and altering pain perception. CBT addresses the underlying mechanisms of central sensitization by promoting neuroplastic changes and reducing hyperactivity in brain regions such as the amygdala, which is implicated in pain amplification and emotional distress (7,8). By challenging negative cognitive patterns, CBT lowers emotional reactivity and enhances pain coping strategies, fostering greater resilience against chronic pain (9). Furthermore, CBT aids in autonomic nervous system regulation, reducing physiological stress responses and enhancing overall pain tolerance (10). Another significant benefit includes the promotion of endorphin release, which naturally attenuates pain perception and improves mood stability (11).

Although numerous studies have evaluated the efficacy of CBT and physical therapy as standalone interventions, limited research has directly compared their combined effects in fibromyalgia management. Given that fibromyalgia is a multifaceted condition involving both physical and psychological components, integrating CBT with conventional physical therapy may offer synergistic benefits, addressing both the cognitive-emotional aspects of pain perception and the physiological mechanisms of musculoskeletal dysfunction. Exploring this integrative approach could provide valuable insights into optimizing treatment strategies, improving adherence to rehabilitation programs, and enhancing overall patient outcomes. By assessing both objective clinical measures and patient-reported outcomes, this study aims to determine whether the combination of CBT and physical therapy yields superior benefits in pain reduction and quality of life improvement compared to physical therapy alone. Findings from this research could guide clinical decision-making, inform treatment protocols, and contribute to a more holistic approach to fibromyalgia management, ultimately benefiting both patients and healthcare practitioners.

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METHODS

A randomized clinical trial (RCT) was conducted at the Physical Therapy Department of Maryam Hospital, Burewala, to evaluate the effectiveness of conventional physical therapy with and without cognitive behavioral therapy (CBT) in patients diagnosed with fibromyalgia. A total of 66 participants were recruited using a consecutive sampling technique, with 33 individuals assigned to each study group. Eligibility was determined based on the American College of Rheumatology (ACR) 2010/2011 diagnostic criteria for fibromyalgia. Participants were required to be between 18 and 65 years of age and have persistent symptoms for at least six months prior to enrollment. Individuals with other chronic pain conditions, severe psychiatric disorders, substance abuse history, unstable medical conditions, or those who had participated in another clinical trial within the past 30 days were excluded to maintain sample homogeneity and ensure the reliability of results. Baseline demographic and clinical characteristics were documented prior to intervention allocation. The control group received conventional physical therapy, while the intervention group underwent a combination of conventional physical therapy and CBT. Both groups received treatment twice a week over a 12-week period. Outcome measures included the Fibromyalgia Impact Questionnaire (FIQ) and the SF-36 Questionnaire, which were used to assess symptom severity, functional limitations, and overall quality of life. Data collection occurred at three time points: baseline, the 6th week, and the 12th week of the study, ensuring an accurate assessment of changes over time.

Statistical analysis was performed using SPSS version 24. Parametric or nonparametric tests were applied based on data distribution normality. Between-group comparisons were analyzed using an independent samples t-test or Mann-Whitney U test, as appropriate. Repeated measures analysis of variance (ANOVA) was employed to assess within-group changes over time, with a significance level set at $p \leq 0.05$. Data were analyzed using an intention-to-treat approach to minimize bias and account for any participant attrition. Ethical approval for the study was obtained from the Institutional Review Board (IRB) of Superior University, Lahore. Participants provided written informed consent before enrollment, ensuring voluntary participation. Confidentiality was maintained throughout the study, and participants were informed of their right to withdraw at any stage without any consequences. The study adhered to the ethical principles outlined in the Declaration of Helsinki, ensuring participant safety, dignity, and data protection.

RESULTS

The sample comprised 28 males (42.4%) and 38 females (57.6%), indicating a slightly higher representation of females. The Kolmogorov-Smirnov test confirmed that data for the Fibromyalgia Impact Questionnaire (FIQ) ($p = 0.081$) and Short Form-36 (SF-36) ($p = 0.092$) were normally distributed, allowing for parametric statistical analysis. Baseline FIQ scores were comparable between groups, with the intervention group reporting a mean of 69.03 ± 6.342 and the control group 68.09 ± 5.496 ($p = 0.523$). Post-intervention, the intervention group exhibited a significant reduction in FIQ scores (18.94 ± 3.682), compared to the control group (48.03 ± 4.599), with a statistically significant between-group difference ($p = 0.001$). Similarly, pre-intervention SF-36 scores did not significantly differ between groups ($p = 0.367$), with the intervention group scoring 30.27 ± 3.439 and the control group 31.03 ± 3.340. However, following treatment, the intervention group demonstrated a substantial improvement (76.33 ± 5.649), significantly higher than the control group (50.61 ± 2.806) ($p = 0.001$).

Within-group comparisons showed a significant reduction in FIQ scores in the intervention group from 69.03 ± 6.342 to 18.94 ± 3.682, yielding a mean difference of 50.09 ± 2.66 ($p = 0.002$). Similarly, SF-36 scores in this group increased from 30.27 ± 3.439 to 76.33 ± 5.649, with a mean improvement of 46.06 ± 2.21 ($p = 0.003$). The control group also demonstrated significant improvements, though less pronounced. FIQ scores decreased from 68.09 ± 5.496 to 48.03 ± 4.599, with a mean difference of 20.06 ± 0.897 ($p = 0.002$). Likewise, SF-36 scores improved from 31.03 ± 3.340 to 50.61 ± 2.806, with a mean difference of 19.58 ± 0.534 ($p = 0.001$). The findings indicate that while both treatment approaches resulted in significant improvements in fibromyalgia symptoms and quality of life, the combined intervention of physical therapy and CBT led to substantially greater improvements compared to physical therapy alone.

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Table 1: Between Groups Comparison (Parametric) of Fibromyalgia Impact Questionnaire (FIQ)

Variable	Group	No	Mean & Std. Deviation	P-Value
Pre_ FIQ	Intervention Group	33	69.03±6.342	.523
	Control Group	33	68.09±5.496	
Post_ FIQ	Intervention Group	33	18.94±3.682	.001
	Control Group	33	48.03±4.599	

Table 2: Between Groups Comparison (Parametric) of Short Form (SF_36)

Variable	Group	No	Mean & Std. Deviation	P-Value
Pre_ Short Form (SF_36)	Intervention Group	33	30.27±3.439	.367
	Control Group	33	31.03±3.340	
Post_ Short Form (SF_36)	Intervention Group	33	76.33±5.649	.001
	Control Group	33	50.61±2.806	

Table 3: Within Groups Comparison (Parametric) of Group A (Intervention Group)

Variable	No	Pre_ Mean & Std. Deviation	Post_ Mean & Std. Deviation	Mean Difference	P-value
FIQ	33	69.03±6.342	18.94±3.682	50.09±2.66	.002
SF_36	33	30.27±3.439	76.33±5.649	46.06±2.21	.003

Table 4: Within Groups Comparison (Parametric) of Group B (control group)

Variable	No	Pre_ Mean & Std. Deviation	Post_ Mean & Std. Deviation	Mean Difference	P-value
FIQ	33	68.09±5.496	48.03±4.599	20.06±0.897	.002
SF_36	33	31.03±3.340	50.61±2.806	19.58±0.534	.001

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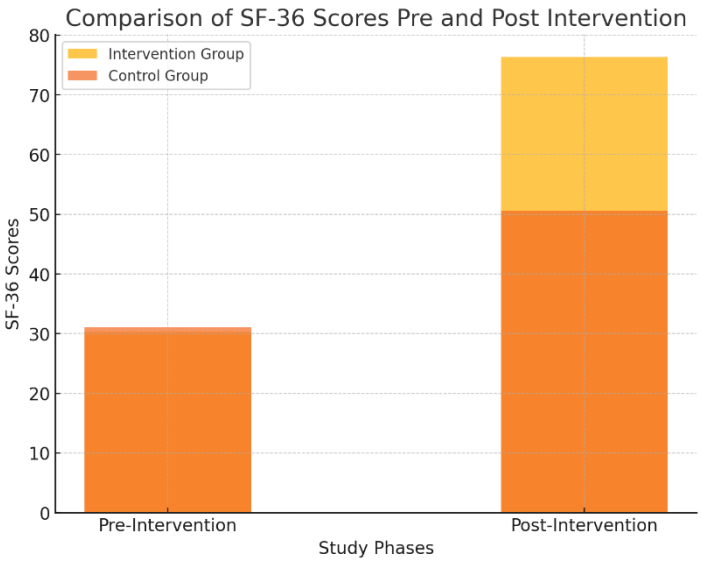


Figure 2 Comparison of SF-36 Score Pre & Post Intervention

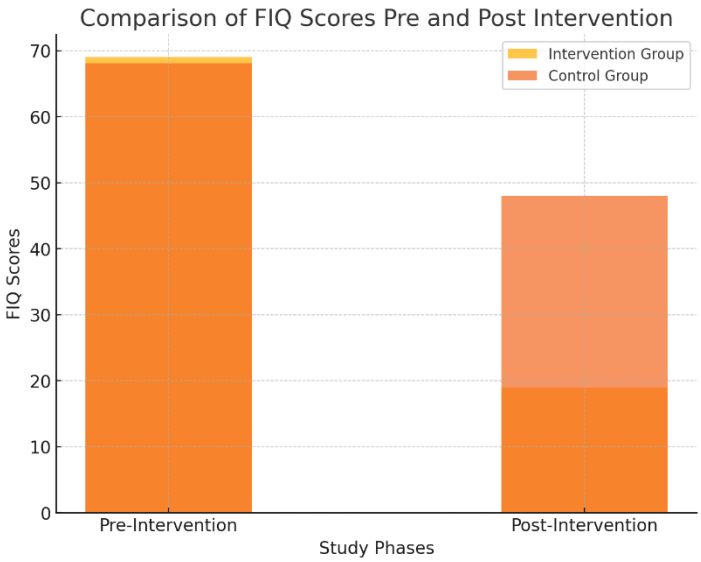


Figure 1 Comparison of FIQ scores pre & Post Intervention

DISCUSSION

The findings of this study demonstrate a significant improvement in fibromyalgia symptoms and quality of life in the intervention group, with greater reductions in Fibromyalgia Impact Questionnaire (FIQ) scores and enhancements in Short Form-36 (SF-36) scores compared to the control group. The intervention group exhibited a mean reduction of 50.09 points in FIQ scores, indicating substantial symptom relief, while the control group showed a comparatively smaller improvement. Similarly, SF-36 scores improved by 46.06 points in the intervention group, highlighting a more profound impact on health-related quality of life. These findings support the notion that a combined approach integrating cognitive behavioral therapy (CBT) with physical therapy yields superior outcomes in fibromyalgia management compared to physical therapy alone (18). Previous research has consistently shown that conventional physical therapy interventions improve fibromyalgia symptoms, yet the magnitude of change observed in the present study suggests that a more integrative approach may offer enhanced benefits. Studies evaluating conventional physical therapy alone reported moderate reductions in FIQ scores and modest gains in quality of life measures, whereas the present study demonstrated a more substantial improvement. This supports the argument that targeting both the physiological and psychological dimensions of fibromyalgia is essential for optimizing treatment outcomes. Research on multidisciplinary approaches has similarly demonstrated that interventions combining physical therapy with psychological support yield more significant symptom relief compared to single-modality treatments. The present study further reinforces this perspective by demonstrating that addressing emotional and cognitive factors through CBT enhances adherence to physical therapy and promotes greater functional improvements (19).

While these findings contribute valuable insights into fibromyalgia management, the study has certain limitations. The use of self-reported questionnaires, such as the FIQ and SF-36, introduces the potential for response bias and subjective variability in symptom assessment. Additionally, uncontrolled factors such as comorbid psychiatric disorders, lifestyle differences, and medication use may have influenced outcomes. Given the chronic nature of fibromyalgia, long-term follow-up studies are necessary to assess the durability of treatment effects beyond the 12-week study period. The inclusion of objective physiological markers, such as neuroimaging or biochemical pain indicators, could further strengthen future research by providing more quantifiable measures of intervention effectiveness. Moreover, the study design did not incorporate patient preference as a variable, which could play a crucial role in determining adherence and long-term treatment success (20). The implications of these findings extend to clinical practice, emphasizing the necessity of a multidimensional treatment strategy for fibromyalgia. The significant improvements observed in quality of life suggest that conventional rehabilitation programs should integrate psychological therapies to maximize therapeutic outcomes. Additionally, alternative modalities such as telehealth-based CBT interventions or home exercise programs could be explored to improve accessibility and adherence, particularly for individuals with mobility limitations or geographic barriers. Future research should focus on developing

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individualized treatment protocols tailored to patient-specific symptom profiles, allowing for more personalized and effective management strategies (5,6). Despite these considerations, the study provides compelling evidence supporting the synergistic benefits of combining physical therapy with CBT in fibromyalgia management. By addressing both central sensitization and maladaptive cognitive patterns, this approach offers a more holistic solution that aligns with the complex and multifaceted nature of the condition. Further investigations with larger sample sizes, longer follow-up durations, and the inclusion of objective outcome measures will be instrumental in refining treatment strategies and enhancing clinical guidelines for fibromyalgia care.

CONCLUSION

The study demonstrated that combining cognitive behavioral therapy with conventional physical therapy leads to significant improvements in fibromyalgia symptoms and overall quality of life. While both groups experienced positive changes, the intervention group achieved a more substantial reduction in symptom severity and functional limitations. These findings emphasize the importance of an integrative approach that addresses both the physical and psychological aspects of fibromyalgia, offering a more effective strategy for symptom management. The results contribute to the growing evidence supporting multidimensional treatment models and highlight the need for their broader implementation in clinical practice to enhance patient outcomes.

AUTHOR CONTRIBUTIONS

Author	Contribution
Amna Shakoor	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Waqas Ashraf Chaudhary*	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Muhammad Sanaullah,	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Khan Manqoosh Awan,	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Zeshan Habib	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published

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