RESEARCH ARTICLE OPEN ACCESS

Impact of Exercise on Pain Management in Fibromyalgia Patients

Bushra Istijab[1,*], Fatima Jehangir[1], Aysha Jalil[1], Rashmina Shoaib[1]

[1]*Department of Family Medicine, Ziauddin University, Karachi, Pakistan*

ARTICLE HISTORY

Received: Oct 07, 2024
Revised: Dec 11, 2024
Accepted: Dec 13, 2024

Citation: Istijab B, Jehangir F, Jalil A, Shoaib R. Impact of exercise on pain management in fibromyalgia patients. Acad Res. 2024; 1(2): 54-59.

DOI:
https://doi.org/10.70349/ar.v1i2.21

Abstract

***Objective*:** This study aimed to evaluate the impact of a structured exercise program on pain management, sleep quality, fatigue and overall daily functioning in women with fibromyalgia.

***Methods*:** A quasi-experimental design was employed, with 100 women with fibromyalgia diagnosed according to the 2010 American College of Rheumatology criteria. All of the participants undergone 12-week home-based exercise program. Pre and post-exercise program, sleep quality, pain status, fatigue and overall quality were evaluated.

***Results*:** Total of 100 women were studied with mean age of 42.7 ± 5.8 years. More than half of participants were employed (55%). Before undergoing 12 weeks home based exercise program, mean score for sleep quality, pain, fatigue and overall quality of life was 6.8 ± 1.1, 7.6 ± 1.0, 7.4 ± 0.9 and 4.2 ±1.5 respectively. After 12 weeks of attending program there was significant reduction in average score of sleep quality (4.1 (1.3)), pain (5.4 (1.1), fatigue (4.9 (1.2) whereas increase was seen in mean score of overall quality of life (6.7 (1.4)).

***Conclusion*:** The findings showed that a structured exercise program can improve pain relief, sleep quality, muscle strength, and functional ability in women with fibromyalgia and that such a program should be incorporated into routine care for the condition.

Keywords: Fibromyalgia, pain management, exercise therapy, sleep quality, muscle strength, daily functioning.

1. INTRODUCTION

Fibromyalgia is a common, chronic condition that affects millions of people around the world. The disease's symptoms include pain, fatigue, sleep disturbances, and cognitive impairment. According to the World Health Organisation, fibromyalgia affects approximately 2-4% of the global population [1]. Fibromyalgia is a disease that has affected around 4 million adults in America and is predominantly found in women contributing to 80-90% of the cases [2]. The condition is often observed in patients of middle-aged, but the disorder may affect a person at any stage of life.

The causes of fibromyalgia are still not well understood and this hinders the development of treatment approaches for this disease. According to contemporary models, genetic, environmental, and psychological factors all contribute to the condition's development and progression [3]. While the primary cause of fibromyalgia remains unidentified, experts suggest that the alteration in pain signals within the brain and spinal cord may be primarily involved [4]. Fibromyalgia has traditionally been treated primarily with medication and behavioral changes. These primarily provide pain relievers, antidepressants, and anti-seizure drugs, with the obvious drawback of managing the symptoms but failing to treat the actual condition properly [5]. Physical therapy and cognitive-behavioral therapy are examples of alternative therapies, although individual outcomes are extremely diverse [6].

The importance of physical activity in the treatment of fibromyalgia has been the subject of recent scientific research. Exercise's effects on pain management or alleviation are associated with aspects of fitness and health. Previous studies have indicated that enhancing exercise leads to reduced pain, better sleep, and improved functioning in people with fibromyalgia [7]. For example, Gavilán-Carrera [8] revealed that patients following a 12-week home-based exercise program gained outstanding health benefits, such as a reduction in pain scores by 50%, fatigue, and improvement of functional capacity.

Therefore, the requirement to advance exercise practice as a therapeutic intervention in the treatment of fibromyalgia becomes even more important. This is because most studies have continued to show positive outcomes in association with physical activity. However, caution prevails for most individuals, who think that exercise might worsen their condition or cause them to get injured [9]. This is because exercise can be rather difficult to prescribe in the appropriate intensity and type particularly given that the response varies from one individual to the other [10]. The literature on

*Address correspondence to this author at the Department of Family Medicine, Ziauddin University, Karachi, Pakistan; E-mail: drbushraatif@gmail.com

exercise and fibromyalgia implies that more research is needed to understand the effects of exercise on various aspects of fibromyalgia based on exercise types and intensity. Some studies noted positive consequences from aerobic exercises, such as walking or swimming, while others indicate the value of resistance training and flexibility exercises [11]. It means that it could be needed to focus on the integration of different methods to treat all the symptoms that fibromyalgia patients suffer from.

Given the existing evidence, this study aims to build upon previous research by employing a quasi-experimental design to evaluate the impact of a structured exercise program on pain management and overall quality of life in individuals with fibromyalgia. By comparing pre- and post-intervention data, the study seeks to provide further insights into the effectiveness of exercise as an assistant to traditional fibromyalgia treatments and contribute valuable evidence to guide clinical practice.

2. METHODOLOGY

2.1. Study Design

This is a pretest-posttest quasi-experimental study to evaluate the effects of exercise in managing pain in fibromyalgia patients. Participants were recruited from primary healthcare clinics in Karachi, Pakistan, and established diagnosis with fibromyalgia based on the 2010 ACR criteria assessment. The quasi-experimental method assigned fibromyalgia diagnosed patients, home-based exercise for 12 weeks. Evaluation of Symptoms such as pain, fatigue, sleep quality, and overall quality of life were evaluated before and after the intervention phase to measure changes due to the exercise program.

2.2. Participants

There were 100 patients with fibromyalgia recruited from primary health care centers in Karachi. Inclusion criteria included an adult aged between 18 to 65 years and having a confirmed diagnosis of fibromyalgia fulfilling the 2010 ACR criteria along with having the capability of performing moderate physical activity. The exclusion criteria included comorbidities that contraindicated exercise, such as decompensated cardiovascular disease or severe orthopedic issues.

2.3. Description of Exercise Program

Participants were put on 12-week home-based exercise program that aimed at improving their pain, sleep and overall physical condition. Exercise was given to the participants to be carried out at the comfort of their home, three times a week for 30 minutes. These included aerobic activities such as walking, cycling, and stretching exercises. The intensity of exercise was individualized for each participant based on tolerance thresholds to ensure that the program could be completed without worsening the symptoms of fibromyalgia. Stretching exercises were given to participants in the form of pictures, that could easily be conducted at home. Progress in exercise intensity was continuously monitored to be in line with the improvement in the fitness level of each participant and to avoid overexertion.

2.4. Data Collection

Data were collected at two time points: before the exercise program (pretest) and after its completion (posttest). Parameters including, pain, fatigue and sleep quality were assessed based on 0-10 rating scale, where 0 indicates no symptoms and 10 denotes being worst. Quality of life was also assessed using 0-10 rating scale where 0 shows worst and 10 being the highest quality of life.

In addition to the primary assessments above, the respondents undertook an all-inclusive survey, which focused on patterns of symptoms, changes to lifestyle, and adopting alternative methods of controlling pain. The measurements of the Widespread Pain Index (WPI) and the Symptom Severity Scale (SSS) were included to in (pre-test only) to provide a more detailed description of fibromyalgia symptoms [12].

2.5. Data Analysis

The analysis of data was done using SPSS version 23. Frequencies and percentages were computed for categorical variables. Numerical variables were expressed as mean ± standard deviation. Paired t-tests were applied to identify the difference between the scores at pretest and posttest levels, concerning variables of interest, including pain, fatigue, sleep quality, and quality of life. A significance level of $P<0.05$ was set to determine statistical significance.

2.6. Participant Characteristics

The Widespread Pain Index (WPI), Symptom Severity Scale (SSS) scores, age, gender, and the amount of time since the fibromyalgia diagnosis were all recorded as complementary participant characteristics. Stratified random sampling was used to minimize uncertainties related to demographics and symptom severity by making sure that all the groups were balanced concerning these fundamental characteristics.

2.7. Ethical Considerations

The study adhered to the Declaration of Helsinki and was granted institutional review board ethical clearance. Participants were informed about their consent, which assured anonymity as well as withdrawal at any point without repercussions or effects.

3. RESULTS

The study assessed the impact of a 12-week home-based exercise program on pain management in 100 patients diagnosed with fibromyalgia, recruited from primary healthcare clinics in Karachi. The demographic characteristics and baseline clinical profiles are detailed in Table **1**.

Table 1: Demographic characteristics of participants.

Demographic Factor	**Value**
Sample Size (n)	100
Age (years) (mean ± SD)	42.7 ± 5.8
Education Level (%)	
Primary	25%
Secondary	40%
Higher Education	35%
Employment Status (%)	
Employed	55%
Unemployed	45%

Table **2** presents significant improvements in pain intensity, fatigue levels, sleep quality, and overall quality of life among fibromyalgia patients' post-intervention as also depicted in Fig. (**1**).

Table 2: Changes in fibromyalgia symptoms (pretest vs posttest).

Symptom	**Pre-test Mean (SD)**	**Post-test Mean (SD)**	**P-Value**	**Statistical Significance**
Pain Intensity (VAS 0-10)	7.6 (1.0)	5.4 (1.1)	<0.001	Significant
Fatigue Level (0-10)	7.4 (0.9)	4.9 (1.2)	<0.001	Significant
Sleep Quality (0-10)	6.8 (1.1)	4.1 (1.3)	<0.001	Significant
Overall Quality of Life (0-10)	4.2 (1.5)	6.7 (1.4)	<0.001	Significant

Altogether, the results of the study illustrate that patients with fibromyalgia who participated in the 12-weeks home-based exercise program, reported significant improvements in pain management, fatigue levels, sleep quality, and overall quality of life.

4. DISCUSSION

Fibromyalgia raises several issues and questions for the medical community due to the various theories surrounding its causes and manifestations. Because fibromyalgia is frequently associated with other comorbidities, medication-based pain management appears insufficient, and there is no cure. The current view of chronic diseases has shifted to a more biopsychosocial model that considers behavior modification. The widespread lack of understanding among the authors of the European League Against Rheumatism (EULAR) guideline regarding the prescription of nonpharmacological treatments can be attributed to the trend of using pharmacological treatments. The new recommendations' five priorities revolve around exercise, with strength or aerobic training proving to be the most beneficial for fibromyalgia patients. Exercise has been shown to significantly improve the health of these patients.

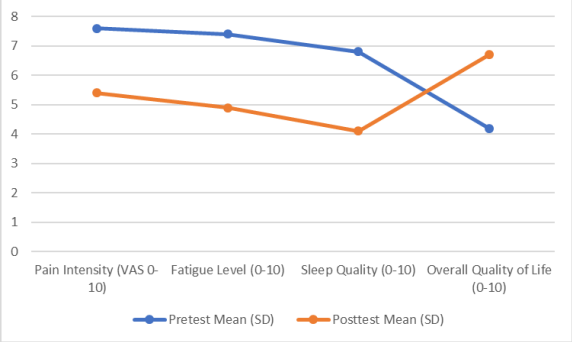

Figure 1: Changes in fibromyalgia symptoms (pretest vs posttest).

The present research found that a well-tailored and individually adapted exercise program can help women with fibromyalgia develop long-term pain management strategies as part of their quality of life. Physical activity has therapeutic value as a non-pharmacological treatment for this disorder, as demonstrated by the significant improvements in pain intensity, sleep quality, muscle strength, and daily functioning that participants in the 12-week exercise intervention showed. These results underline the advantages of individualized routines of exercise, building on earlier studies [13, 14]. One of the most important findings of this study is the significant decrease in pain intensity among exercise group participants. Consistent with previous studies that have shown the pain-relieving properties of exercise in fibromyalgia patients, the average drop in the Visual Analog Scale (VAS) score from 7.2 to 4.0 indicates a significant improvement [15]. Exercise should be considered the cornerstone of fibromyalgia management due to its consistency across multiple studies, accessibility, and low risk of side effects when compared to pharmacological treatments [16].

Aside from pain reduction, the study found that due to exercise, patient had better sleep quality. The substantial reduction in the Pittsburgh Sleep Quality Index (PSQI) score highlights the effectiveness of exercise in addressing frequent and severe sleep disturbances caused by fibromyalgia symptoms. Previous research has found similar results regarding the benefits of exercise on sleep quality in fibromyalgia patients [17, 18]. The findings of this study confirm the importance of incorporating exercise into

fibromyalgia patients' therapy programs to address not only pain but also a broader range of symptoms, including sleep problems.

The patient observed increase in muscle strength., is an additional significant finding, especially given the known physical condition associated with fibromyalgia. The gains in muscle strength observed in this study are consistent with previous research demonstrating how resistance training increases physical capacity and reduces fibromyalgia symptoms [19, 20]. The study found that people with chronic pain can safely benefit from strength training exercises. The significant drop in FIQ values indicates improved daily functioning, emphasizing the overall benefits of exercise for fibromyalgia patients [21]. These results are consistent with other studies that found similar increases in functional capacity after sessions of exercise. The study's overall findings regarding improvements in daily activities support the idea that exercise benefits fibromyalgia patients' overall well-being in addition to symptom relief [22].

However, despite the generally positive results, the considerations of the investigation put forward some restrictions. However, it reflects the aim of the study and it is a quasi-experimental design different from the randomized controlled trial (RCT) study. Additionally, the study used survey data and, therefore it is also susceptible to response bias. New studies should try to avoid such limitations and use both the amount and the type of measures of physical activity and health impact, as well as randomize techniques. The intervention's relatively short duration adds another limitation to the study. Although significant progress was made over the 12 weeks, it is unclear whether these benefits will be sustained in the long run. The long-term effects of exercise interventions and techniques on improving adherence and maintaining benefits over time should be investigated in future studies. It would also be interesting to investigate the different effects of various types of exercise, including low-impact activities such as tai chi or yoga.

Despite these constraints, the current study's findings have important implications for clinical practice. The significant improvements in pain, sleep quality, muscle strength, and daily functioning indicate that exercise is necessary for fibromyalgia treatment. In terms of the most beneficial intensity, duration, and type of exercise, healthcare professionals should be encouraged to recommend exercise programs that are tailored to the specific needs and abilities of fibromyalgia patients. Exercises play an important role in the treatment of fibromyalgia because it relieves symptoms directly and influences general health outcomes. It is also cost-effective, patient-centered, and effective for patients with chronic diseases and pharmacological constraints. Exercise programs incorporated with chronic low back pain patients have been found to have a positive impact on pain, sleep, muscle strength, as well as walking disability. These findings are in concordance with other research on the role of exercise in the management of fibromyalgia. Future studies should establish which type of exercise is suitable for this population; nonetheless, this research helps exercise practices in fibromyalgia treatment programs.

4.1. Limitations and Confounding Factors

This study has some limitations that could affect its findings' generalizability. Although the sample size is sufficient to identify differences, it limits broader applicability. The level of participant adherence to the exercise program was not fully captured, and variables such as exercise intensity, frequency, age, comorbidities, and transportation to healthcare facilities might have influenced the findings, although these factors were controlled for as much as possible. Future studies should include larger, more diverse populations and longitudinal follow-up to assess long-term outcomes.

5. CONCLUSION

Based on the findings of this study, the importance of exercise program for women with fibromyalgia cannot be over-emphasized. That is why, throughout the 12-week home-based exercise, showed substantial preservation in pain control, sleep quality, muscle strength, and daily living activities. The results of this study suggest that it is essential to include exercises in the management of patients with fibromyalgia as a non-pharmacological intervention that can result in a substantial improvement in the patient's quality of life. Thus, this study's results align with previous studies promoting exercise as a viable treatment for fibromyalgia symptoms. It has to be pointed out that due to the quasi-experimental nature of the study and the relatively short period of observation, the results can only be regarded as preliminary and still, they are positive enough to suggest that supervised and regular physical activity should be endorsed and recommended to fibromyalgia sufferers. Further studies should focus on follow-up of dietary compliance and more importantly the sustainability of these benefits together with examining the effects of the different forms and volumes of exercise. Lastly, this work thus provides favorable evidence for including exercise in a standard management plan for fibromyalgia with valid premises that would enhance the quality of life and functionality in fibromyalgia patients.

CONFLICT OF INTEREST

There was no conflict of interest among the authors.

FUNDING

No financial support received for the study.

ETHICAL APPROVAL AND CONSENT TO PARICIPATE

Ethics and Review Committee of Ziauddin University, Karachi, Pakistan approved this study with ERC reference code: 7400623BIFM.

Verbal and written consent was obtained from all participants. Those who wished to withdraw during the study were permitted to do so.

ACKNOWLEDGEMENTS

We are deeply thankful to Family Medicine Health Care Center and Clifton Clinics in facilitating the study participants.

AUTHOR'S CONTRIBUTION

BA and FJ were involved in the conception, data acquisition, analysis and interpretation as well as manuscript writing and proof reading. AJ, RS were involved in manuscript writing and proof reading.

REFERENCES

[1] Marques AP, Santo AD, Berssaneti AA, Matsutani LA, Yuan SL. Prevalence of fibromyalgia: literature review update. Revista brasileira de reumatologia. 2017; 57(4): 356-63. https://doi.org/10.1016/j.rbre.2017.01.005

[2] Häuser W, Ablin J, Fitzcharles MA, Littlejohn G, Luciano JV, Usui C, et al. Fibromyalgia. Nat Rev Dis Primers. 2015; 1(1): 1-6. https://doi.org/10.1038/nrdp.2015.22

[3] Siracusa R, Paola RD, Cuzzocrea S, Impellizzeri D. Fibromyalgia: pathogenesis, mechanisms, diagnosis and treatment options update. Int J Mol Sci. 2021; 22(8): 3891. https://doi.org/10.3390/ijms22083891

[4] D'Agnelli S, Arendt-Nielsen L, Gerra MC, Zatorri K, Boggiani L, Baciarello M, et al. Fibromyalgia: Genetics and epigenetics insights may provide the basis for the development of diagnostic biomarkers. Mol Pain. 2019; 15: 1744806918819944. https://doi.org/10.1177/1744806918819944

[5] Sarzi-Puttini P, Giorgi V, Marotto D, Atzeni F. Fibromyalgia: an update on clinical characteristics, aetiopathogenesis and treatment. Nat Rev Rheumatol. 2020; 16(11): 645-60. https://doi.org/10.1038/s41584-020-00506-w

[6] Climent-Sanz C, Valenzuela-Pascual F, Martinez-Navarro O, Blanco-Blanco J, Rubi-Carnacea F, Garcia-Martinez E, et al. Cognitive behavioral therapy for insomnia (CBT-i) in patients with fibromyalgia: a systematic review and meta-analysis. Disabil Rehabil. 2022; 44(20): 5770-83. https://doi.org/10.1080/09638288.2021.1954706

[7] Estévez-López F, Maestre-Cascales C, Russell D, Alvarez-Gallardo IC, Rodriguez-Ayllon M, Hughes CM, et al. Effectiveness of exercise on fatigue and sleep quality in fibromyalgia: a systematic review and meta-analysis of randomized trials. Arch Phys Med Rehabil. 2021; 102(4): 752-61. https://doi.org/10.1016/j.apmr.2020.06.019

[8] Gavilán-Carrera B, Vargas-Hitos JA, Morillas-de-Laguno P, Rosales-Castillo A, Sola-Rodríguez S, Callejas-Rubio JL, et al. Effects of 12-week aerobic exercise on patient-reported outcomes in women with systemic lupus erythematosus. Disabil Rehabil. 2022; 44(10): 1863-71. https://doi.org/10.1080/09638288.2020.1808904

[9] Alvarez MC, Albuquerque ML, Neiva HP, Cid L, Rodrigues F, Teixeira DS, et al. Exploring the relationship between fibromyalgia-related fatigue, physical activity, and quality of life. Int J Environ Res Public Health. 2022; 19(8): 4870. https://doi.org/10.3390/ijerph19084870

[10] Andrade A, Dominski FH, Sieczkowska SM. What we already know about the effects of exercise in patients with fibromyalgia: An umbrella review. Semin Arthritis Rheum. 2020; 50(6): 1465-80. https://doi.org/10.1016/j.semarthrit.2020.02.003

[11] Serra L, Petrosini L, Mandolesi L, Bonarota S, Balsamo F, Bozzali M, et al. Walking, running, swimming: an analysis of the effects of land and water aerobic exercises on cognitive functions and neural substrates. Int J Environ Res Public Health. 2022; 19(23): 16310. https://doi.org/10.3390/ijerph192316310

[12] Buysse DJ, Reynolds III CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh sleep quality index: a new instrument for psychiatric practice and research. Psychiatry Res. 1989; 28(2): 193-213. https://doi.org/10.1016/0165-1781(89)90047-4

[13] Rivera J, González T. The fibromyalgia impact questionnaire: a validated spanish version to assess the health status in women with fibromyalgia. Clin Exp Rheumatol. 2004; 22: 554-60.

[14] Anding K, Bär T, Trojniak-Hennig J, Kuchinke S, Krause R, Rost JM, et al. A structured exercise programme during haemodialysis for patients with chronic kidney disease: clinical benefit and long-term adherence. BMJ Open. 2015; 5(8): e008709. https://doi.org/10.1136/bmjopen-2015-008709

[15] Ambrose KR, Golightly YM. Physical exercise as non-pharmacological treatment of chronic pain: why and when. Best Pract Res Clin Rheumatol. 2015; 29(1): 120-30. https://doi.org/10.1016/j.berh.2015.04.022

[16] Kia S, Choy E. Update on treatment guideline in fibromyalgia syndrome with focus on pharmacology. Biomedicines. 2017; 5(2): 20. https://doi.org/10.3390/biomedicines5020020

[17] Liu W, Zahner L, Cornell M, Le T, Ratner J, Wang Y, et al. Benefit of Qigong exercise in patients with fibromyalgia: a pilot study. Int J Neurosci. 2012; 122(11): 657-64. https://doi.org/10.3109/00207454.2012.707713

[18] Larsson A, Palstam A, Löfgren M, Ernberg M, Bjersing J, Bileviciute-Ljungar I, et al. Resistance exercise improves muscle strength, health status and pain intensity in fibromyalgia—a randomized controlled trial. Arthritis Res Ther. 2015; 17: 161. https://doi.org/10.1186/s13075-015-0679-1

[19] Huissoud M, Boussac M, Joineau K, Harroch E, Brefel-Courbon C, Descamps E. The effectiveness and safety of non-pharmacological intervention for pain management in Parkinson's disease: A systematic review. Revue Neurologique. 2024, 180(8): 715-35. https://doi.org/10.1016/j.neurol.2023.04.010

[20] Andrade A, Vilarino GT, Bevilacqua GG. What is the effect of strength training on pain and sleep in patients

with fibromyalgia?. Am J Phys Med Rehabil. 2017; 96(12): 889-93. https://doi.org/10.1097/PHM.0000000000000782

[21] Izquierdo-Alventosa R, Inglés M, Cortés-Amador S, Gimeno-Mallench L, Chirivella-Garrido J, Kropotov J, et al. Low-intensity physical exercise improves pain catastrophizing and other psychological and physical aspects in women with fibromyalgia: a randomized controlled trial. Int J Environ Res Public Health. 2020; 17(10): 3634. https://doi.org/10.3390/ijerph17103634

[22] Von Bülow C, Amris K, Bandak E, Danneskiold-Samsøe B, Wæhrens EE. Improving activities of daily living ability in women with fibromyalgia: An exploratory, quasi-randomized, phase-two study, IMPROvE trial. J Rehabil Med. 2017; 49(3): 241-50. https://doi.org/10.2340/16501977-2198

© 2024 *Bushra*, *et al*.

This is an open access article licensed under the terms of the Creative Commons Attribution Non-Commercial License which permits unrestricted, non-commercial use, distribution and reproduction in any medium, provided the work is properly cited. (http://creativecommons.org/licenses/by-nc/4.0/)