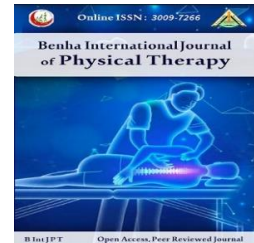


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Original research

Efficacy of Qigong exercise on sleep quality in patients with fibromyalgia.

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Abstract

Background: Patients with fibromyalgia usually have chronic, widespread musculoskeletal pain and associated fatigue, sleep disturbances, and other cognitive and somatic symptoms. **Purpose:** To investigate the efficacy of Qigong exercise on sleep quality in patients with fibromyalgia. **Methods:** Forty-five females with fibromyalgia participated in this study. They were selected from outpatient clinics at Al-Azhar University Hospitals from September to November 2023. Their ages were 30–50 years old. Subjects were subdivided into two groups. The study group, consisting of thirty patients, received Qigong (active and passive) exercise, medical treatment, and an anti-inflammatory diet, while the control group, consisting of fifteen patients, received medical treatment and nutritional interventions. Treatment lasted 8 weeks, and the exercises were performed three times per week. The outcome measures were reassessed at baseline and after 8 weeks. Outcome measures included sleep quality and fatigue, which were assessed by the Pittsburgh Sleep Quality Index and Fatigue Severity Scale, respectively. **Results:** The results showed that there was a significant decrease in the Pittsburgh Sleep Quality Index and Fatigue Severity Scale post-treatment within groups compared with pre-treatment ($p > 0.001$), while there was no significant difference between groups post-treatment ($p > 0.05$). **Conclusion:** Qigong exercise had no additional benefit over the traditional program of medications and diet. **Keywords:** fibromyalgia, Qigong exercise, sleep quality.

Introduction

Fibromyalgia (FM) a disease of unknown and complex etiopathogenesis, FM is characterized by chronic and widespread pain, fatigue, sleep disturbances, cognitive dysfunction, depression,

and other somatic symptoms. FM affects about 5% of the world population. The incidence is higher in women than in men, and the age range in which FM generally appears is between 30 and 35 years.¹

The type, location and severity of pain depends on a number of modulating factors, the most important of which are working activities, comorbidities (such as obesity) and variations in temperature, physical or mental stress is also a known factor associated with worsening pain.²

Anxiety and depression are two comorbidities frequently associated with fibromyalgia and chronic pain, being present in 30–50% of patients at the time of disease diagnosis.³ Chronic pain and depression exhibit a bidirectional relationship, mediated by neuroplasticity that involves similar brain structures, neurotransmitters, and signaling pathways, leading to both psychological and physical symptoms.⁴

Poor sleep is reported by almost 80% of patients with fibromyalgia.⁵ The pain and poor sleep provoke persistent stress-immune activation. Poor sleep effects on quality of life and other medical and psychiatric manifestations.⁶

Decrease in sleep quality is significantly correlated with the severity of pain, fatigue, depression and stress symptoms and reduced quality of life, especially with regard to mental health, suggesting that the treatment of this disease should include sleep disorder interventions.⁷

Fatigue is one of the main symptoms reported by patients with FM, their fatigue is characterized by excessive physical, mental, and cognitive tiredness and that it is usually not alleviated after hours of sleep or rest, which may end up hindering the performance of work or daily tasks, and thus may contribute to the adoption of sedentary behavior.⁸

The other symptoms of fibromyalgia headache, dyspepsia, abdominal pain and alternating constipation and diarrhea are also common symptoms, and might be part of a full-blown irritable bowel syndrome. Additional symptoms are stiffness and lower limb discomfort and a need to move their legs continuously (restless legs syndrome).² FM symptoms can significantly reduce the quality of life of patients and may even contribute to pain sensations.⁹

No abnormalities are seen in fibromyalgia in routine clinical laboratory testing or imaging⁴. The diagnostic criteria, screening and instruments have been developed in the clinical setting. However, the most widely used criteria have been that of the American College of Rheumatology, 1990, as revised in 2016.³

Because of the subjectivity of the symptoms and the lack of biomarkers, diagnosis is exquisitely clinical, and diagnostic criteria are constantly evolving; early diagnosis and prevention are still elusive goals. Fibromyalgia severity and progression or improvement can be evaluated by means of a plethora of composite tests.²

Current clinical guidelines for the management of patients with FM recommended multimodal conservative treatments to improve the pain-related symptoms, the physical function and the quality of life. Among the conservative treatments, clinical guidelines include non-pharmacological therapies such as exercise therapy, mind-body therapies, patient education, manual therapy, needling therapies and others.¹⁰

Qigong is a total body and mind movement that coordinates body posture, movement and breathing and has been used for thousands of years in China to promote health. As a mind-body exercise, the key elements of Qigong are body movement, spiritual guidance and controlled breathing. Qigong can enhance the cardiorespiratory endurance and flexibility reduce anxiety, improve the psychological well-being, thus promoting the development of their physical and mental health.¹²

Therefore, the current study was conducted to demonstrate any significant effect of Qigong exercise on sleep quality and fatigue in patients with fibromyalgia.

Methods

The Ethics Committee of Cairo University's Faculty of Physical Therapy gave its clearance to this study (number P.T.REC/012/004897Egypt). Clinical trial Identifier: NCT06347042

The study's techniques and objectives were well understood by the patients and adhered to ethical guidelines. Written informed consent was acquired from every patient involved. Forty - five patients diagnosed with fibromyalgia were enrolled in the present study; they were recruited from outpatient clinics, Al-Azhar University Hospitals. Their ages ranged from 30 to 50 years old. They were randomly assigned to two groups: Experimental group n=30 received Qigong exercise three times/week for 8

successive weeks in addition to the anti-inflammatory diet with medical treatment, while control group n=15 received anti-inflammatory diet with medical treatment. The study was carried out from September to November, 2023.

Randomization:

This is a single-centered, convenient sampling, randomized, parallel-group intervention trial. Simple randomization using a randomization table designed by a computer software program was used in this study with an allocation ratio of 1:1. Sequentially numbered opaque sealed envelopes (SNOSE) were used to conceal the allocation sequence so that neither the researcher nor the participant was aware of the upcoming assignment.

Measures and procedures:

This study collected data on each patient in both groups including weight, height, BMI, sleep quality by Pittsburgh Sleep Quality Index (PSQI) and Fatigue by Fatigue Severity Scale (FSS) before and after 8 weeks of treatment.

Treatment procedures:

Experimental group received Qigong exercise training; temperature was set at 21°C

Frequency of 3 days a week and 60 min a day, including a 15 min warm up, 40 min Qigong exercise and 5 min cool down.¹³

Patients sat upright in a comfortable position, closed their eyes, and breathed in and out diaphragmatically with their belly. It is recommended to sit for 10 minutes or more to focus on the breath. Active Qigong: Combines Guolin (walk accentuated by coordinated arm swing resulting in trunk rotation and breath regulation) with Shibashi (18 Movements each movement repeated 3 to 5 times according to study protocol). Individual Qigong Exercises: Practiced in a smooth, continuous flow. Shibashi Combines Breathing and Movement Exercises, Weight Shifting, Coordination of Leg and Arm Movement, and Controlled Breathing. All Shibashi movements centered around face forward position. The patients were encouraged to take frequent breaks if they had a sensation of fatigue.

Experimental and control group were received Anti-inflammatory diet. Anti-inflammatory food components ingestion of

walnuts and omega 3 rich fish, such as tuna, mackerel, sardines, and salmon. Thus, the intake of foods rich in antioxidants, such as fruit and vegetables, is also being promoted. The variability in the choice of vegetables and fruits was promoted, in order to obtain several different antioxidants, such as vitamin C (kiwi, orange), phenolic compounds (black grapes, pomegranate, blackberries, and raspberries), apple, indole-3-carbinol (broccoli, cabbage), and vitamin A (pumpkin, carrot, sweet potato). The intake of other foods rich in antioxidants was also promoted, such as cocoa, ginger and green tea. Also, beans, seeds, whole grains and unsaturated fats (olives and olive oil) were within the plan of diet to take. The most important factors in an anti-inflammatory diet are the maintenance of glycemic index, through a greater intake of fibers and suitable proteins and fats, against a balanced intake of carbohydrates. Exclusion of potential inflammatory foods, such as free sugar, and ultra-processed food, rich in sugar, hydrogenated fat, and food additives with limited dairy.^{14,15}

Statistical analysis:

Unpaired t-test was conducted for comparison of age and BMI between groups. Normal distribution of data was checked using the Shapiro-Wilk test. Levene's test for homogeneity of variances was conducted to test the homogeneity between groups. Unpaired t test was conducted for comparison of PSQI and FSS between groups. Paired t test was conducted for comparison between pre and post treatment in each group. The level of significance for all statistical tests was set at $p < 0.05$. All statistical analysis was conducted through the statistical package for social studies (SPSS) version 25 for windows (IBM SPSS, Chicago, IL, USA).

Results

General characteristics of the subjects:

Experimental group: Thirty women with fibromyalgia were included in this group.

Control group: Fifteen women with fibromyalgia were included in this group.

Figure 1 shows a flow diagram for patients' recruitment and retention.

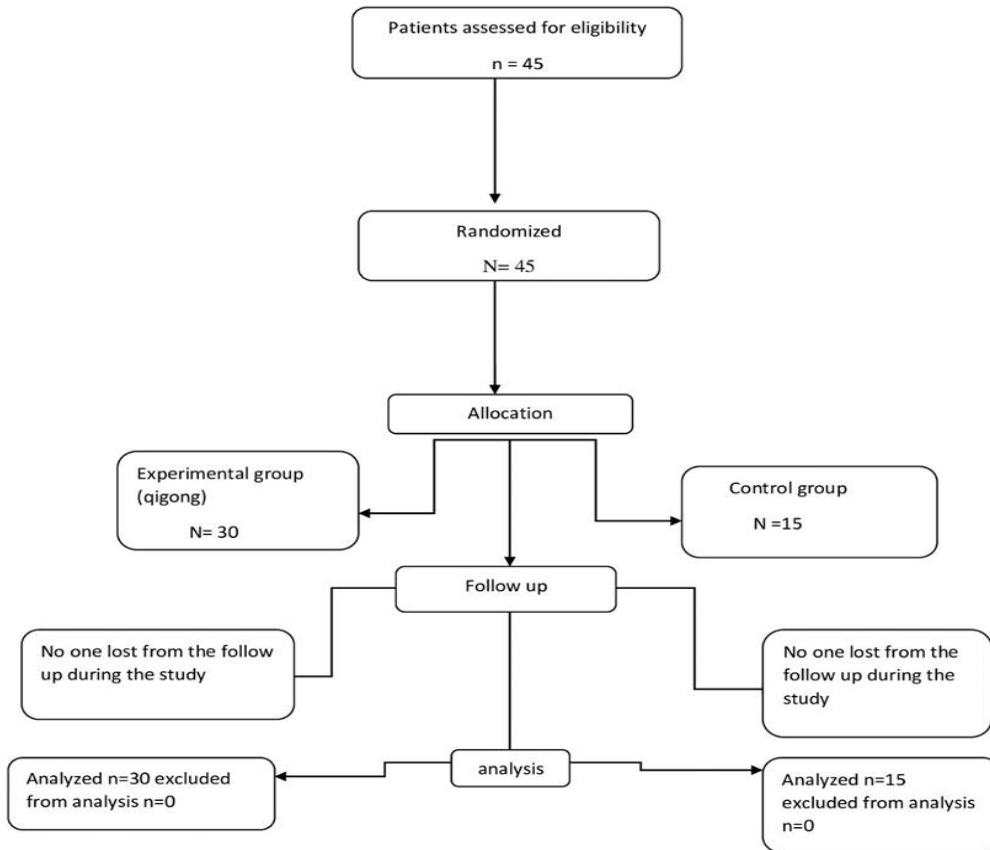


Figure 1: Study data flow chart

- Subject characteristics:

Table (1) showed the subject characteristics of study and control groups. There was no significant difference between groups in age and BMI ($p > 0.05$).

Table 1: Comparison of subject characteristics between study and control groups

	Study group	Control group	MD	t- value	p-value
	Mean \pm SD	Mean \pm SD			
Age (years)	36.47 \pm 6.15	37.87 \pm 4.89	-1.4	-0.76	0.44
BMI (kg/m ²)	26.42 \pm 5.03	25.76 \pm 5.94	0.66	0.38	0.70

SD, Standard deviation; MD, Mean difference; p value, Probability value

Effect of treatment on PSQI and FSS:

Within group comparison

There was a significant decrease in PSQI and FSS post treatment in both groups compared with that pretreatment ($p < 0.001$). The percent of change in BMI, PSQI and FSS of study group was 1.51, 25.4 and 18.62% respectively and that in control group was 1.05, 12.58 and 13.27% respectively. (table 2).

Between group comparison

There was no significant difference between groups pretreatment ($p > 0.05$). There was no significant difference in PSQI and FSS between groups post treatment ($p > 0.05$). (table 2).

Table 2: Effect of treatment on PSQI and FSS

	Study group	Control group	MD	t-value	p value
	Mean \pm SD	Mean \pm SD			
PSQI					
Pre treatment	11.97 \pm 2.14	11.13 \pm 2.07	0.84	1.24	0.22
Post treatment	8.93 \pm 1.72	9.73 \pm 1.28	-0.8	-1.59	0.11
MD	3.04	1.4			
% of change	25.4	12.58			
t-value	13.34	5.95			
	<i>p = 0.001</i>	<i>p = 0.001</i>			
FSS					
Pre treatment	47.80 \pm 5.51	46.20 \pm 4.66	1.6	0.96	0.34
Post treatment	38.90 \pm 2.77	40.07 \pm 3.59	-1.17	-1.20	0.23
MD	8.9	6.13			
% of change	18.62	13.27			
t-value	13.67	7.86			
	<i>p = 0.001</i>	<i>p = 0.001</i>			

SD, Standard deviation; MD, Mean difference; p value, Probability value

Discussion

The current study was conducted to figure out any significant effect of Qigong exercise on sleep quality and fatigue in patients with fibromyalgia. The major findings according to

analysis conducted within groups showed that there was a significant decrease in PSQI and FSS post treatment in both groups compared with that pretreatment ($p < 0.001$). The percent of change in PSQI and FSS of experimental group was 25.4 and 18.62% respectively and that in control group was 12.58 and 13.27% respectively. While, the results showed no statistically significant difference in

PSQI and FSS between groups post treatment ($p > 0.05$)

This result of the present study is contradicted with a previous study conducted by Sarmiento et al., who investigated effect of a daily Qigong on FM symptoms. 20 participants with FM were randomly assigned to Qigong with participants blinded to the intervention allocation. The (A) group practiced Qigong. The (B) group practiced only mild body movements. The experimental group experienced greater clinical improvements when compared to the control group on the mean score differences of pain, sleep quality, chronic fatigue, anxiety, depression, and fibromyalgia impact, all being statistically significant at $p < 0.05$. Therefore, the conclusion was the practice of Qigong appears to have a positive impact on the main fibromyalgia symptoms that is beyond group interaction.¹⁶

As well as in a study conducted by Wang and Luo, on 936 participants from both genders. The meta-analysis revealed that traditional Chinese exercise significantly surpassed the control group in reducing pain scores for fibromyalgia patients VAS [MD = -1.87, 95, $p < 0.00001$]. Additionally, TCE demonstrated notable enhancements in sleep quality (PSQI) [MD = -2.23, 95%, $p < 0.0001$]. Moreover, Wang and Luo, who showed that Qigong may be beneficial for improving fatigue in patients diagnosed with various diseases.¹⁷

The explanation behind the difference between the finding of the current study and other three previous studies is that all participants were women with different BMI. However, there are a number of variables that affect the quality of sleep, such as sociodemographic variables including lifestyle habits, chronic physiological and psychological conditions, and environmental factors as well. Age, perceived stress levels, pain tolerance and smartphone addiction.¹⁸ In addition, medications like antidepressants, can interfere with sleep by altering neurotransmitter activity or stimulating the nervous system, affecting sleep duration and quality.¹⁹

On the other hand, the findings of a study conducted by Lauche et al., were agreed with the results of the current study. Lauche et al., who showed the studies that compared Qigong with active treatment. The types of participants the patients with fibromyalgia were eligible, regardless of age, condition's duration, or intensity. No

further restriction regarding diagnostic procedures was applied. The outcomes were pain, sleep quality, fatigue and depression. Length of follow-up: no restrictions regarding length of follow-up were applied. Short-term effects were defined as measures taken directly after the intervention and long-term effects as measures taken closest to 12 months after randomization. Qigong was practiced between 6 and 12 weeks with one or two supervised sessions a week and additional home practices up to two sessions a week. Lauche et al., found no effects on pain were found for short-term (SMD = -0.22; 95% CI -1.04 to 0.60) or long-term effects (SMD = -0.04; 95% CI -0.58 to 0.49; $p = 0.87$) of Qigong compared to active treatments on pain intensity. No effect of Qigong was found for sleep quality on the short-term (SMD = -0.03; 95% CI -1.64 to 1.58; $p = 0.97$). Long-term comparisons were not possible due to lack of data. On Fatigue no effect of Qigong was found for fatigue on the short-term (SMD = -0.36; 95% CI -2.36 to 1.63; $p = 0.72$). Long-term comparisons were not possible due to lack of depression data: no effect was found for depression on the short-term (SMD = -0.40; 95% CI -1.07 to 0.27).²⁰

Limitations:

This study was limited to the following aspects: small sample of patients, short duration of follow up.

Conclusion:

The present study showed that Qigong had no beneficial effect on women with fibromyalgia when compared with anti-inflammatory diet and medical treatment.

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Conflict of interest:

The authors declare that they have no competing interests.

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