

## Original Article

# The effect of therapeutic use of music on quality of life in fibromyalgia patients

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**Abstract.** This study's aim was to determine the effect of music therapy on symptoms and functions in patients with fibromyalgia syndrome (FMS). Women diagnosed with FMS for at least 6 months included in the study. 16 patients were in the music treatment group and 51 patients were in the control group. Patients in music treatment group were given a music CD which includes nature sounds recommended by the Turkish Psychological Association. The patients were evaluated with Fibromyalgia Impact Questionnaire (FIQ) before and after the treatment. The FIQ-function ( $p<0.001$ ), FIQ-overall impact ( $p=0.001$ ) and FIQ-symptoms ( $p<0.001$ ) subscales improved after music treatment. All FIQ scores were similar in controls before and after treatment. FIQ total score ( $p=0.001$ ), symptoms score ( $p=0.006$ ), overall impact score ( $p=0.008$ ) and function score ( $p=0.010$ ) were lower in the music group after treatment. In conclusion, this study supports a potential benefit of music in the treatment of FMS and FMS-associated symptoms.

**Keywords:** Fibromyalgia, music therapy, fibromyalgia impact questionnaire.

## Introduction

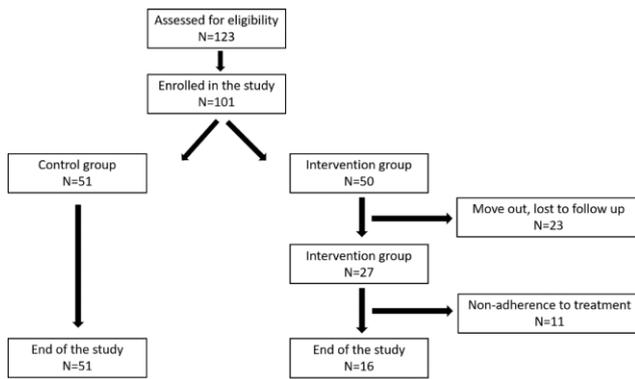
Fibromyalgia syndrome (FMS) is a chronic pain syndrome accompanied by fatigue, sleep disorders, mood changes, cognitive and memory disorders, and also sensory processes can be affected [1-4]. It has been suggested that the central and autonomic nervous system, neurotransmitters, hormonal or immune system dysfunctions, or psychiatric factors are effective on FMS pathogenesis [5]. However, FMS pathophysiology has not been fully elucidated due to the absence of a diagnostic laboratory and imaging method available for the diagnosis of FMS. Its prevalence has been reported to range between 1.7 % and 5.4 % [6]. Fibromyalgia has not considered as a disease by the World Health Organization until 1992 [7].

FMS is a challenging and non-curable disease because of the complicated and incomprehensible pain observed in patients experiencing a restriction in intentional movements and functional mobility due to generalized pain [8]. The most preferred treatments in the treatment of FMS include anti-convulsant, serotonin-noradrenaline reuptake inhibitors, exercise-based treatments, psychology-based treatments, and complementary/alternative treatments. There is increasing evidence that non-pharmacological treatments

are effective as well as pharmacological treatments [9]. Based on current data concerning non-pharmacological treatments acupuncture, biofeedback, chiropractic, cognitive-behavioral therapies, aerobic exercise, hydrotherapy/spa therapy, hypnotherapy, massage, meditation, awareness / mind-body therapy, homeopathy can be effective [10].

Music, which is a common consensus between cultures, is taken into consideration as a general relaxant and a hobby. Today, therapies are available in different concepts, with varying duration and repetitions, applied with the help of music therapists or musical instruments. With the increasing number of evidence-based studies, the effect of music therapy, when added to the treatment of some diseases, has been proved. It has been suggested that the analgesic effect of music is exerted by central mechanisms [11]. Considering mood disorders and pain observed in FMS patients, it is thought that music can be used in the treatment of FMS. In a limited number of studies, the effects of different types and complicated music treatments used for FMS patients were examined. Therefore, in this study, unlike other studies in FMS patients, the aim was to show the effect of music therapy composed of sounds of nature on disease-related

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**Figure 1.** Study design.

symptoms and functions in randomized controlled study design.

### Materials and Methods

This study was planned between 01/06/2017 and 01/12/2017 in a prospective randomized controlled study design. Between these dates, 101 FMS patients who met the inclusion and exclusion criteria of the study were reached. For FMS, female patients over the age of 18, who met the 2010 American College of Rheumatology (ACR) criteria and diagnosed with FMS at least six months previously, were included in the study. People with hearing problems, pregnancy, another accompanying central sensitization syndrome or schizophrenia, etc.; those with a psychiatric illness, and patients whose pharmacological treatment for FMS changed within the last three months, those without music listening devices, and not sufficient socio-cultural level to understand the questionnaire or scale items to be responded by them were excluded from the study. The patients were randomized to both groups in a 1: 1 ratio. Accordingly, 50 patients in the intervention and 51 patients in the control group were enrolled in the study. However, 34 of the 50 patients left the study because they declined music therapy, moved out, or lost –to follow-up. The study was performed with 16 FM patients in the intervention group and 51 FM patients in the control group. With G \* Power 3.1.9.2 program, when an alpha error of 0.05, it was calculated that the power of the study was 87% in the number of 16/51 patients.

Figure 1 represents the study design. A total of 101 patients with fibromyalgia were included for the study. The patients were randomized to both groups in a 1: 1 ratio. 23 patients were excluded from the study because of move out or lost to follow up. 11 patients were drew from the study because of non-adherence to treatment. Analysis did not include these 34 patients. The study was completed with 16 patients).

Data concerning age, education level, occupation and comorbid disease of all patients were recorded at baseline. No changes were made to the conventional treatments that patients were receiving in both treatment groups. The intervention group was asked to listen to a 30-minute music concert consisting of sounds of nature. They were asked to

listen to music in a comfortable and quiet environment. They were requested not to divide, stop, change the speed until the music ended. The piece of music was created under the supervision of an experienced music therapist. Music pieces were chosen from sounds of nature because they are universal, easily accessible, and had been previously shown to be effectively used for therapeutic purposes [12]. Music therapy lasted 30 minutes every day for a total of 20 days. Patients were called by phone and their compliance with music therapy applied every other day, and side effects associated with music therapy were questioned.

Before treatment, all patients were evaluated using the Fibromyalgia Impact Questionnaire (FIQ) scoring system, and FIQ scores of patients were re-evaluated on the 20<sup>th</sup> day after treatment. Intra- and intergroup changes in FIQ scores were analyzed.

The Fibromyalgia Impact Questionnaire developed in 1991 by Burckhardt et al. [13] was used in the study. This scale was revised in 1997 [14]. Ediz et al. [15] conducted the Turkish validity and reliability study of the Revised Fibromyalgia Questionnaire (FIQ) in 2011. The revised FIQ scale is a scale that evaluates the limitations and functional disability in FM patients with 20 questions in three sections: function, overall impact, and symptoms. The higher the score obtained from the survey, the disability of fibromyalgia worsens.

### Compliance with Ethical Standards

This study was approved by the Clinical Research Ethics Committee of Dışkapı Yıldırım Beyazıt Training and Research Hospital (Date 16.01.2017, Approval no: 34/13). This study was carried out in accordance with the Helsinki Declaration. Informed consent was obtained from all individual participants included in the study. The study was registered at ClinicalTrials.gov ID: NCT04823117.

### Statistical analysis

Statistical analyzes were made using SPSS version 20.0 (IBM®, Chicago, USA) package program. The suitability of variables to normal distribution was examined using visual (histogram and probability graphs) and analytical methods (Shapiro-Wilk test). In normally distributed numerical data descriptive statistics age, FIQ function before and after treatment, symptom, and total score) were expressed as mean and standard deviation. For non-normally distributed numerical data they were given as median and min-max value, and for nominal data as numbers and percentages.

Normally distributed numerical variables were analyzed between the two groups by using the t-test in independent groups and within the group with matched-pairs t-test. Spearman and Pearson correlation tests were used in the correlation analysis. Numerical variables not normally distributed were compared between the two groups with the Mann -Whitney U test and within the group with the Wilcoxon signed-rank test. Nominal data were evaluated between two groups using the chi-square test. In statistical analyzes used in the study, p-value below 0.05 was considered statistically significant.

TABLE 1  
ANALYSIS OF SOCIODEMOGRAPHIC AND CLINICAL FEATURES

Variable	Conventional therapy n=51 (%)		Music therapy n=16 (%)		p value
Age (Mean ± SD)	43.1 ± 10.2		41.8 ± 8.9		0.640*
Education					0.927**
Primary school	35	68.6	11	68.8	
High school/University	16	31.4	5	31.2	
Profession					0.809**
Housewife/unemployed	40	78.4	13	81.2	
Employed	11	21.6	3	18.8	
Comorbidity (+)	33	64.7	6	37.5	0.054**
Musculoskeletal (+)	7	13.7	3	18.8	0.623**

\* t-test; \*\*Chi-square test.

TABLE 2  
DISTRIBUTION OF FIQ SCORES BEFORE TREATMENT

FIQ	Conventional therapy (n=51)	Music therapy (n=16)	p value
Function (Mean±SD)	3.9 ± 2.3	3.4 ± 1.2	0.440*
Median overall impact (range)	10.0 (0-20.0)	10.0 (0-20.0)	0.767**
Symptom (Mean±SD)	48.0 ± 13.0	49.6 ± 12.1	0.666*
Total (Mean±SD)	62.3 ± 16.3	63.3 ± 12.4	0.806*

\* t-test; \*\*Mann Whitney U test; FIQ= Fibromyalgia Impact Questionnaire.

TABLE 3  
DISTRIBUTION OF FIQ SCORES AFTER TREATMENT

FIQ	Conventional therapy (n=51)	Music therapy (n=16)	p value
Function (Mean±SD)	3.9±2.2	2.7±1.1	0.010*
Median overall impact (range)	10.0 (0-20)	4.2 (0-15.7)	0.008**
Symptom (Mean±SD)	47.0±14.4	33.7±15.5	0.006*
Total (Mean±SD)	61.0±17.5	42.6±16.9	0.001*

\* -test; \*\*Mann Whitney U test; FIQ= Fibromyalgia Impact Questionnaire.

## Results

### Sociodemographic and clinical features

The mean age of the conventional treatment group was 43.1 ± 10.2 years, and the average age of the music therapy group was 41.8 ± 8.9 years. There was no age difference between the groups (p = 0.640), and the majority of the patients were primary school graduates in both groups (68.6 % vs. 68.8 %, p = 0.927). Very few patients were actively working in both the conventional treatment group and the music therapy group (21.6 %, 18.8 %, p = 0.809). Thirty-nine (58.2 %) patients had comorbid diseases. The groups were similar in terms of the frequency of comorbid diseases (cardiovascular system, gastrointestinal system endocrine system, psychiatric and musculoskeletal diseases) (p = 0.054). The sociodemographic and clinical features of the patients are summarized in Table 1.

### Intergroup analyzes

Before treatment, FIQ-function (p = 0.440), FIQ-overall impact (p = 0.767), FIQ-symptom (p = 0.666) and FIQ-total score (p = 0.806) did not differ between the groups (Table 2). After treatment, FIQ -function (p = 0.010), FES-overall impact (p = 0.008), FIQ-symptom (p = 0.006) and FIQ-total scores (p = 0.001) in the music therapy group were significantly lower than the conventional group. In the music therapy group, there was a decrease of 30.8 % in FIQ-function scores, 40.6 % in FIQ-overall impact score, 28.3 % in FIQ-symptom scores, and 32.6 % in FIQ-total scores (Table 3).

### Intragroup analyzes

Before the treatment, mean values for FIQ-function 3.9 ± 2.3, FIQ-overall impact 10.0 (0-20.0), FIQ-symptom 48.0 ± 13.0, FIQ-total 62.3 ± 16.3 scores in the control group were as indicated. After their current treatments, mean values for FIQ-function 3.9 ± 2.2, FIQ-overall impact 10.0 (0-20.0), FIQ-symptom 47.0 ± 14.4, FIQ-total 63.2 ± 17.5 scores were as indicated. As expected in the control group, no changes were observed in FIQ-function (p = 0.827), FIQ-overall impact (p = 0.601), FIQ-symptom (p = 0.304) and FIQ-total scores (p = 0.237) after their current treatments.

Before the treatment, in the music therapy group, mean values for FIQ -function 3.4 ± 1.2, FIQ-overall impact 10.0 (0-20.0), FIQ-symptom 49.6 ± 12.1, FIQ-total 63.3 ± 12.4 scores were as indicated. After treatment, mean values for FIQ-function 2.7 ± 1.1, FIQ-overall impact 4.2 (0-15.7), FIQ-symptom 33.7 ± 15.5, FIQ-total 42.6 ± 16.9 scores were as indicated. In the music therapy group, FIQ-function (p < 0.001), FIQ-overall impact (p = 0.001), FIQ-symptom (p < 0.001) and FIQ-total scores (p < 0.001) decreased significantly after treatment (Table 4).

### FIQ scores and related factors

There was no correlation between patients' ages and FIQ-function (p = 0.663), FIQ-overall impact (p = 0.431), FIQ-symptom (p = 0.710) and FIQ-total scores (p = 0.651) before treatment. There was no correlation between patients' ages and FIQ-function (p = 0.586), FIQ-overall impact (p = 0.738), FIQ-symptom (p = 0.953), and FIQ-total scores (p = 0.971) after treatment.

FIQ-function, FIQ-overall impact, FIQ-symptom, and FIQ -total scores did not change both before and after treatment according to the education, occupational status, presence of comorbid disease of the patients (all p > 0.05).

### Discussion

FMS treatment is among the challenging diseases due to its unclear etiology and pathophysiological mechanisms. Preferred evidence-based pharmacological treatments include antidepressants (amitriptyline, duloxetine, milnacipran), anti-epileptics (pregabalin) and other drugs (tramadol, pramipexole, memantine) [16]. However, the effect of pharmacological treatments alone is limited. On the other hand, the effect spectrum of non-pharmacological treatments has been reported to be higher than the effect spectrum observed in drug treatments [17]. A variety of methods have been preferred for non-drug treatments. These

TABLE 4  
DISTRIBUTION OF FIQ SCORES BEFORE/AFTER TREATMENT

Conventional therapy			
FIQ	Before treatment	After treatment	p value
Function (Mean±SD)	3.9 ± 2.3	3.9 ± 2.2	0.827*
Median overall impact (range)	10,0 (0-20)	10,0 (0-20.0)	0.601**
Symptom (Mean±SD)	48.0 ± 13.0	47.0 ± 14.4	0.304*
Total (Mean±SD)	62.3 ± 16.3	63.2 ± 17.5	0.237*
Music therapy			
FIQ	Before treatment	After treatment	p value
Function (Mean±SD)	3.4 ± 1.2	2.7 ± 1.1	<0.001*
Median overall impact (range)	10,0 (0-20.0)	4,2 (0-15.7)	0.001**
Symptom (Mean±SD)	49.6 ± 12.1	33.7 ± 15.5	<0.001*
Total (Mean±SD)	63.3 ± 12.4	42.6 ± 16.9	<0.001*

\* t-test; \*\*Wilcoxon Signed Ranks testi; FIQ= Fibromyalgia Impact Questionnaire.

methods include exercise therapy, hot or cold application, spa treatment, cognitive behavioral therapy, magnetotherapy, biofeedback, and music therapy [18]. It was previously stated that music therapy is effective in patients with FMS, in reducing pain and it also provides increased functionality associated with a decrease in pain [19]. However, data in the field of music therapy are limited. On the other hand, the fact that the available data, music concerts and culture differ among geographic regions reduces the generalizability of the results of the studies. This study aimed to evaluate the effect of more universal-themed music therapy on the loss of function and symptoms caused by FMS and to compare it with conventional therapy.

The first remarkable finding of this study was the increase in the functions evaluated with FIQ scale with music therapy, and the decrease in the overall effect level and symptom severity due to FMS. The developments observed were more pronounced compared to the conventional treatment group. Our findings indicated that music therapy was effective in FMS patients. The effectiveness of music therapy has been confirmed in a small number of studies performed on patients with FMS [19-25]. In spite of these findings, it can be said that music therapy in FMS patients should be among the treatment methods of FMS patients despite the distinct methodological differences between studies.

The analgesic effect of music on pain has been linked to cognitive and emotional effects originating from listening to music. These effects include distraction of pain, feeling of pleasure-happiness, stimulated memory, and relaxation [26-28]. Besides, listening to music, have been associated with the secretion of dopamine from the caudate nucleus and nucleus accumbens [26]. Dopamine is known to play a role in central analgesia [29]. It has been suggested that music-based analgesia is central-type analgesia, and that analgesic effect is exerted in the brainstem and by functions of the emotional cortex through central neurotransmitters rather than peripheral receptors [21].

Despite significant methodological differences, it has been reported in previous studies that music therapy has an impact on the functional status and / or symptoms of FMS patients. In a study performed by Garza-Villarreal et al. [21] in the year 2014, 11 FMS patients listened relaxant music pieces selected by the patients; while in another group, 11 patients listened “pink noise” consisting of environmental noise. In the music therapy group, improvement in pain and functional mobility was noted as assessed by the pain and “Timed up & Go” (TUG) test. In the single-blind randomized study conducted by Espi-Lopez et al. [19] in 2016, the FMS patients were divided into therapeutic exercise and music therapy (n = 13), therapeutic exercise (n = 13) and the control groups (n = 9), and it has been shown that therapeutic exercise is effective in the relief of discomfort and depression, but when combined with music therapy, the therapeutic exercise was found to be more effective. In their study in 2014, Picard et al. [22] analyzed the change in FIQ and Jenkin Sleep Scale scores after music therapy in 20 patients. In this study, it was stated that it is a music with mostly 2 Hz binaural beats promoted sleep. All participants were provided with the same MP3 device and headphones, and it was reported that music should be preferred at bedtime. How often and how well the patients complied with the treatment was also recorded. Significant improvement in FIQ total score and Jenkin Sleep Scale scores were observed in the study. Naghdi et al. (2015) investigated the effect of low-frequency sound stimulation in 19 FMS patients. There was a marked improvement in the FIQ score, Jenkins Sleep Scale, and pain scores. In addition, it was stated that painless sitting and standing time prolonged, and range of motion of the cervical joint increased. No side effects were observed during low-frequency sound stimulation. However, there was no control group in this study. In a randomized controlled study conducted in 2016 in our country by Alparslan et al. [20], the effect of music therapy on pain was evaluated in 21 intervention patients and 16 control subjects who were followed up in the rheumatology clinic. It was stated that the severity of pain assessed at the 1st, 7th and 14th days in the music group decreased significantly, but not in the control group. In the study conducted by Demirbağ et al. [25] in 2012, the effectiveness of music therapy was evaluated in 162 female FMS patients. Preferred music included at least four classical Turkish music maqams, ie. Housseini, Saba, Rast, and Ussaq. It was stated in the study that depression levels were more markedly decreased with music therapy, besides, non-restful sleep, headache, fatigue, and intestinal problems were also reduced. In a randomized controlled study conducted by Weber et al. [30], 120 FMS patients were divided into four groups: Group 1 listened to Bach classical music, vibratory stimuli were applied on acupuncture points in Group 2. In Group 3, patients listened to Bach, and also vibratory stimuli were applied at acupuncture points while Group 4 was the control group. The patients were evaluated with FIQ and “Health Assessment Questionnaire” (HAQ). While improvement in FIQ and HAQ scores was observed in all intervention groups, the best results were obtained in Group 3 that received music and vibratory stimulus therapy.

Although music therapy has been reported to reduce symptoms of FMS in most studies, there were important methodological differences between studies in terms of the duration, application method, repetition, and type of music therapy. The most important reason for choosing the sounds of nature in this study was that they were accessible to everyone. It has been previously shown that the sounds of nature can be used for the treatment of different diseases. It was previously reported that music therapy is useful in the treatment of anxiety [12] in reducing psychological stress [31] and in reducing pain in cardiac surgery patients [32]. It was stated by the Turkish Psychological Association that the sounds of nature provide relaxation [20]. On the other hand, in this study, it has been shown that music therapy is a method that can be applied by patients because it does not require additional costs and cause complications. Also, it can be added to the routine treatments of patients.

In this study, the home treatment method was preferred due to the fact that the treatment can be done in the home environment, and does not cause additional health expenses, besides health professionals do not need to spare time for home treatment. In this way, hospitals and hospital staff are not needed for music therapy. On the other hand, it should be noted that patient compliance will be lower when music therapy is provided in the home environment.

The study had some limitations. Firstly, since treatment is recommended in this study using music CDs or similar methods, it can be thought that patients listen to music with different sound quality and different sound levels. Secondly, patients who did not apply music therapy for the desired time period and frequency were excluded from the study. Therefore, it may be thought that more voluntary patients comply with the treatment. In addition, patients were evaluated after a relatively short treatment in this study. We could not determine the longevity of the effectiveness of music therapy in this study.

In conclusion, in this randomized controlled study, it was found that music therapy consisting of sounds of nature showed improvement in the overall effects, symptoms, and functions as shown by the FIQ scale scores in female FMS patients, and the success rates achieved were significant compared to the control group. It can be said that music therapy, which does not require additional cost, and complication is not observed can be added to the routine treatments of the patients. Music therapy can be preferred in the treatment of patients who do not get the desired response with pharmacological treatment. Although it is stated in the literature that many different music forms may be effective, music therapy consisting of sounds of nature may be more advantageous because music therapy is easily accessible by everyone, and there is evidence-based data about its effectiveness and its universality.

### Conflict of Interest

The authors declare no conflicts of interest.

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