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Amanda M. Vicznesky
Philadelphia College of Osteopathic Medicine

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Is Music Therapy Effective At Reducing Pain In Fibromyalgia Patients?

Amanda M. Vicznesky, PA-S

A SELECTIVE EVIDENCE BASED MEDICINE REVIEW

In Partial Fulfillment of the Requirements For

The Degree of Master of Science

In

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Department of Physician Assistant Studies
Philadelphia College of Osteopathic Medicine
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ABSTRACT

OBJECTIVE: The objective of this selective evidence based medicine (EBM) review is to determine whether or not music therapy is effective at treating pain in fibromyalgia patients.

STUDY DESIGN: This is a systematic review of three primary studies that were peer-reviewed published between the years of 2013-2016.

DATA SOURCES: Two randomized control trials and one cross-control study evaluating if music therapy is affective at treating pain in fibromyalgia patients. Data sources obtained for this review were found using PubMed Database.

OUTCOMES MEASURED: The outcome measured was the effectiveness of music therapy at reducing pain in fibromyalgia patients. Outcomes were measured via the verbal rating scale and visual analog scale.

RESULTS: The studies by Alparslan et al and Onieva-Zafra et al found that music therapy was effective at reducing pain in fibromyalgia patients when compared to a control group that underwent no intervention.^{7,8} In the study by Garza-Villarreal et al patients experienced a reduction in pain following music therapy as opposed to the control group listening to white noise who did not experience a reduction in pain.¹ Statistical significance ($p < 0.05$) was found in the reduction of pain in the intervention group for all three studies.^{1,7,8}

CONCLUSIONS: All studies evaluated in this EBM review showed that music therapy can be effective at treating pain in fibromyalgia studies.

KEY WORDS: Fibromyalgia; Music

Introduction

Fibromyalgia is a disorder that causes widespread pain all over the body accompanied by sleep disturbances, depression, memory problems, and fatigue.¹ While there is no cure for fibromyalgia, symptoms may be reduced by a variety of pharmacologic or non-pharmacologic approaches.² This paper evaluates two randomized controlled trials (RCTs) and one cross control study evaluating the efficacy of music therapy at reducing pain in fibromyalgia patients.

Fibromyalgia affects approximately four million people in the United States, which is approximately 2% of the population.³ Fibromyalgia affects both men and women, however it is much more common in women. It is estimated that 12-14 billion dollars is spent per year on fibromyalgia patients.⁴ Cost of care for fibromyalgia can be extensive and fibromyalgia can also affect finances due to loss of productivity. It is estimated that fibromyalgia accounts for 1-2% loss of overall productivity in the United States.⁴ Fibromyalgia patients are also more likely to utilize healthcare resources. It was found that 98% of fibromyalgia patients had been to at least one medical specialist in the past six months.⁵ Fibromyalgia patients may find it difficult to afford associated increased healthcare cost while experiencing loss of productivity as well.

The underlying cause of fibromyalgia is unknown, however people with this condition may be more sensitive to pain than those without fibromyalgia.² It was hypothesized that fibromyalgia was an autoimmune disorder, however it is now suspected that the nervous system may be responsible for the increased pain sensitivity.² Patient's symptoms are likely to be triggered by an event such as injury or stress.² Symptoms of fibromyalgia may differ in each patient. These symptoms include: tenderness to touch or pressure in multiple areas of the body, severe fatigue, sleep problems, or problems with memory.⁶ Symptoms tend to come and go and the pain is likely to migrate to different areas of the body.² It is very common for those with

fibromyalgia to have comorbid conditions such as: depression, anxiety, migraines, irritable bowel syndrome, or gastroesophageal reflux disease.⁶ Fibromyalgia is a diagnosis of exclusion and should only be diagnosed if no other health condition could better explain the symptoms.²

Current treatment involves educating patients on their condition, teaching proper sleep hygiene, and treating comorbid conditions.⁶ Patients are also encouraged to begin regular exercise. Exercise programs may include stretching, strengthening, and aerobic conditioning.⁶ Many patients are not able to control their pain through non-pharmacologic options alone. Pharmacologic treatments may help in reducing pain as well as treating comorbid anxiety and depression. Common pharmacologic treatments are tricyclic antidepressants such as amitriptyline, serotonin/norepinephrine reuptake inhibitors such as duloxetine, and pregabalin, an anticonvulsant.⁶ Many patients also undergo cognitive behavioral therapy.⁶ Treatment approaches vary and have different efficacy in each patient.⁶

The treatments listed above may all play a role in the treatment of fibromyalgia. Multiple therapies may be required to see a reduction in symptoms.⁶ Music therapy is being examined as an alternative or adjunctive therapy in reducing pain in fibromyalgia. Patients may experience a reduction in not only pain but also in their depressive symptoms. Music therapy may also help to act as a relaxation technique for those with fibromyalgia. Given that stress is a known precipitating factor in those with fibromyalgia this may also help to decrease not only intensity but also recurrence of symptoms.⁶ It is theorized that music may reduce pain through relaxation and stimulation of the parasympathetic nervous system.⁷ Music therapy could act as a cost-effective way to treat patients with fibromyalgia.

Objective-

The objective of this selective evidence based medicine (EBM) review is to determine whether or not music therapy is effective at treating pain in fibromyalgia patients.

Methods

Two randomized control trials and one cross control study were selected for this EBM review.^{1,7,8} The population studied were patients with a diagnosis of fibromyalgia. The intervention in each study was music therapy for 10 minutes or greater. In the studies by Onieva-Zafra et al, and Alparslan et al intervention of music therapy was compared to a control group that did not undergo any additional therapy.^{7,8} In the cross-control study by Garza-Villarreal et al the intervention of music therapy was compared to white noise.¹ The outcome of interest in this EBM review was a reduction in pain intensity for the patient after undergoing music therapy.^{1,7,8}

Three studies were found using PubMed database using the keywords “fibromyalgia” and “music.” All studies were published in peer reviewed journals and were chosen based upon relevance to the clinical question. All studies were chosen based upon the presence of patient oriented evidence that matters (POEMs). Inclusion criteria involved studies that were published after 2012, randomized control trial or a cross control study, and participants were patients with fibromyalgia over the age of 18. Exclusion criteria consisted of articles with a population that had not had a diagnosis of fibromyalgia for at least one month. **Table 1** provides demographic information of the studies included in this EBM review. The statistics used in all three of the studies was the p-value.^{1,7,8}

Table 1: Demographics & Characteristics of included studies

Study	Type	# Pts	Age	Inclusion Criteria	Exclusion Criteria	W/D	Interventions
Alparslan (2016) ⁸	RCT	37	18 years old	-Diagnosis, and treatment of	-Diagnosis of complex disease	0	Music therapy that involved

			or older	fibromyalgia >1 month -Access to music player or device -In pain for >1 month	-Having a communication problem		listening to a specific music CD for at least 25 minutes 2 times per day.
Garza-Villarreal (2014) ¹	Cross Control Study	22	22-70 years old	-Diagnosed with Fibromyalgia for more than 1 year -Reported normal hearing and no music training -Able to abstain from alcohol, exercise, analgesic medication, caffeine, and smoking	Impossibility to walk -Morbid obesity -Uncontrolled endocrine disorders -Hearing deficiency -Pregnancy or lactation -Left handedness - MRI incompatibility	0	Music therapy that involved listening to a music piece that is pleasant and slower than 120 beats-per-minute for 10 minutes.
Onieva-Zafra (2013) ⁷	RCT	60	45-65 years old	-Age 45-65 years old with a diagnosis of fibromyalgia for three years or more. -Agreed to go to therapy	- Major psychiatric conditions -Inability to understand or follow instructions -Inability to read and write Spanish -Deafness	5	Music therapy involving listening to a CD 4 times the first week and every day of the second week. Repeated with a 2 nd CD.

Outcomes Measured

All outcomes measured being evaluated in this EBM review were considered POEMs.

The three studies used two different methods to measure outcomes used in this review. In the

studies by Onieva-Zafra et al and Alparslan et al the outcome was measured by the Visual

Analog Scale (VAS).^{7,8} In the study by Garza-Villarreal et al the outcome was measured by the

Verbal Rating Scale (VRS).¹ The outcome measured was the level of pain. The study by Onieva-Zafra measured level of pain with movement and level of pain at rest.⁷

Results

Two randomized control trials and one cross control study were analyzed in this review. Each study compared the effectiveness of music therapy in treating pain in patients over the age of 18 who had been diagnosed with fibromyalgia.^{1,7,8}

The clinical trial by Alparslan et al was a randomized control trial that involved 37 patients with all 37 of the patients being evaluated in this systematic review.⁸ Patients involved were over the age of 18 years old with the diagnosis of fibromyalgia for greater than 1 month. Patients were divided into an intervention group (n=21) and control group (n=16). Criteria sampling of the patients was used for randomization.⁸ After examination by a physician, patients in the control and intervention completed the VAS by face-to-face interview method with the researchers.⁸ Patients in the intervention group were given a music CD and were asked to listen to the CD for at least 25 minutes two times per day, once in the morning and once in the evening. Patients were to listen to the CD while sitting in a comfortable chair and quiet environment, without being overly hungry or full and while not doing any other activities.⁸ Patients in the control group did not receive a CD. This study lasted for 2 weeks and no participants withdrew during that time. The study asked participants to rate their pain intensity using the VAS on days 1, 7, and 14.⁸ Table 2 below shows the results from the study.

Table 2: Mean (SD), VAS pain scores in the intervention and control group by days⁸

Group	Day 1,	Day 7	Day 14	p value
Intervention: Music	5.45 (\pm 2.73)	4.57 (\pm 2.71)	4.14 (\pm 2.45)	0.026
Control: No music	6.25 (\pm 2.41)	5.68 (\pm 3.28)	5.40 (\pm 3.11)	0.853

As depicted in the results shown in table 2, patients in the intervention group showed a statistical difference in reduction of pain while the control group did not.⁸ There was also a significant difference in pain between day 1 and day 14 ($p=0.022$) in the intervention.⁸ There was not a statistical difference in reduction of pain between day 1 and day 7 ($p=0.069$) and between days 7 and 14 ($p=.369$) in the intervention group. According to the study, music therapy is effective at reducing pain in fibromyalgia patients and the reduction in pain started very early on in the study.⁸

The cross-control study by Garza-Villarreal et al, involved 22 patients who had been diagnosed with fibromyalgia for over 1 year.¹ Patients involved were between the age of 22 and 70 years old. All 22 patients were interviewed prior to their participation and determined to be eligible for the study.¹ Patients were asked their favorite songs, musician or band. Songs were chosen based upon the patient's suggestions and varied in genre. Songs were prescreened by researchers to ensure that all songs would have low beats-per-minute.¹ In the study two different auditory backgrounds of 10 minutes were used. White noise acted as the control and a musical piece acted as the intervention. The study was conducted with the patient sitting in a comfortable chair in a well-lit and sound proof room.¹ Patients were instructed to stare at a focus on a cross on a computer screen to ensure the patient did not fall asleep during the study. Half of patients listened to white noise first as a control and half of the patients listened to the music intervention first.¹ Each patient listened to auditory stimuli for 10 minutes. The patients then had a 10-minute washout period in which they watched a documentary.¹ The patients then listened to the other auditory stimuli, the control piece of white noise or the music intervention. Patients were asked to rate their pain intensity and pain unpleasantness using the VRS. Patients rated their pain

before and after both the control of white noise and the music intervention.¹ **Table 3** depicts the results and statistical significance shown in the study.

Table 3: Mean (SD), VRS pain intensity and pain unpleasantness¹

Intervention	PI Before	PI After	PI p	PU Before	PU After	PU p
Music	5.00 (±2.45)	3.95 (±2.80)	0.04	5.29 (±2.70)	3.95 (±2.97)	0.006
White Noise (control)	5.29 (±2.00)	5.14 (±4.02)		5.33 (±2.50)	4.80 (±2.69)	

PI=Pain intensity; PU= Pain unpleasantness.

As shown in the results above patients only showed a reduction in pain following music intervention. The decrease in pain levels of the study group can be attributed to the music intervention.¹ This study shows that music therapy is more effective at reducing pain over an environment of white noise.

The study by Onieva-Zafra et al began with 60 patients to be followed over the course of 4 weeks.⁷ Patients involved in this study were patients with fibromyalgia between the ages of 45-65 who had been diagnosed with fibromyalgia for 3 or more years. Patients were divided into an intervention group (n=30) and a control group (n=30).⁷ Five patients were lost to follow, 3 in the control group and 2 in the intervention group. Fifty-five total patients are being evaluated in this EBM review, with 28 in the control group and 27 in the intervention group.⁷ The intervention group was designed with two phases and two different CDs. The first phase involved listened to the first CD for one hour per day for 4 or more days during the first week and every day during the second week.⁷ The control group was not given CDs. Patient's in the intervention and control reported their pain levels at baseline and after 4 weeks. Pain levels were also reported based upon pain at rest and pain with movement.⁷ All tests were performed with a 95% confidence interval (CI; $\alpha=.05$). Results are reported in **Table 4** below.

Table 4: Mean (SD), VAS pain scores from intervention and control group.⁷

Group	Baseline	After 4 weeks	p value, change from baseline	p value, reduction in pain with movement	p value, reduction with pain at rest
Intervention-Music	8.96 (± 0.5)	6.99 (± 1.14)	0.042	0.002	0.001
Control- No music	9.01 (± 0.07)	8.91 (± 1.12)	0.528	0.42	0.08

The intervention group experienced reduced pain in change from baseline, pain with movement, and pain at rest. Pain was not significantly changed in the control group.⁷ This study shows that music therapy can be effective at reducing pain in fibromyalgia patients.

DISCUSSION

The three trials discussed in this review suggest that music therapy can be effective at reducing pain in patients with fibromyalgia. Each study found a significant reduction in pain with statistical significance being set at $p < 0.05$.^{1,7,8} These studies suggest that music therapy may be used as adjunctive therapy for those with fibromyalgia with positive results. Other outcomes were also assessed that may suggest that music therapy may provide more benefit than only decreased pain intensity. For example, Onieva-Zafra et al also determined that music therapy provided a statistically significant improvement in depression in fibromyalgia patients.⁷ Overall, the studies showed that music therapy can have a positive impact on patients with fibromyalgia with no negative outcomes reported.^{1,7,8}

One major benefit to music therapy is that it is widely available at little to no cost. Music is accessible at almost any location through radio or internet. Situations in which a patient would not have access to music are very limited. Patients could also use music therapy in any situation, including a crowd, if headphones were available. As a non-pharmacologic treatment option music therapy would not need to be monitored by a medical professional which could help cut down on medical costs. No adverse effects were reported in the studies and given that music is a

common part of any individuals daily life it is unlikely any adverse effects could be reported.^{1,7,8} Physicians, PA's and NP's who treat fibromyalgia patients could include suggestions of music therapy with ease during initial education on the patient's condition. Music therapy may be able to limit pharmacologic treatment in patients with fibromyalgia thus decrease potential side effects and improving quality of life, however further study is warranted on the impact of music therapy only as an alternative rather than an adjunctive treatment.

A limitation of the studies discussed in this review is the lack of placebo or intervention comparison in the control group. In the study by Alparslan et al and Onieva-Zafra et al the patients were not given any intervention to expect any change in their pain level.^{7,8} In this case, the placebo effect could have been present especially given that the pain is self-reported. Fibromyalgia is a chronic condition and many of these patients had been experiencing pain for years. Without any intervention, the patient may perceive the same level of pain given that nothing has changed in their medication regimen. If the studies had included another non-pharmacologic treatment in the control group such as exercise or painting it would help determine if music therapy was responsible for their reduction in pain rather than perceived intervention that could lead to a decrease in pain. In the study by Garza-Villarreal et al patients had an intervention of white noise.¹ While listening to white noise, the patients may have found the white noise to be annoying. There was no other stimuli in the room and patients were expected to focus upon a cross on a computer.¹ Patients may have found the white noise to be annoying and the opposite of relaxing. While the study did show that patients had a reduction in pain in music, it was only compared to sitting in a room with white noise and no distracting stimuli which is generally not expected to be relaxing or help with pain. With no intervention to compare the studies can only say that music is more effective at reducing pain than no

intervention.^{1,7,8} The results of the studies evaluated in this EBM review still provide valuable information through the results shown that music therapy can be effective therapy at reducing pain in fibromyalgia patients, but it does not show it is more effective than other therapies.^{1,7,8}

Other limitations in these studies include small sample size and short follow up. In the study by Alparslan et al only 37 patients were following in the study for only 2 weeks.⁸ The patients were also not divided equally between the control and intervention group. The intervention group had 21 patients while the control group only had 16 patients.⁸ In the study by Garza-Villarreal et al only 22 patients were studied with the study only lasting for 1 day.¹ The study by Onieva-Zafra et al had the most patients (n=55) and was conducted for the longest period of time (4 weeks).⁷ While all three of these studies could have been conducted for a longer period of time with more patients to help show validity in the results, they provide valuable information that music can be used as a short term treatment for pain.

Conclusion

The studies included in the EBM review all shared similar results that music therapy can be effective at treating pain in fibromyalgia patients. The studies by Alparslan et al and Garza-Villarreal et al showed that music therapy is effective when compared to a control group with no intervention.^{7,8} In the study by Onieva-Zafra et al it showed that music therapy is effective at reducing pain when compared to the control of white noise.¹ Given that music therapy is associated with little to no cost and based upon the results of these studies, music therapy should be considered as an adjunctive or alternative therapy for patients with fibromyalgia.

Additional study is warranted to evaluate whether music therapy is effective at reducing pain when compared to other interventions. Possible interventions could be art therapy, journaling, or exercise. All of the studies evaluated in this EBM had a small sample size and

lacked blinding of the participants. Further study should involve blinding the patients so they are unaware which intervention is being studied. Patients should also be followed for a longer period of time to see if the results are consistent long term. This treatment should be investigated further because it could be a safe treatment option for those with fibromyalgia and potentially other patients with chronic pain.

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