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The effects of music listening, autogenic training, and music-assisted autogenic training on the quality of life, relaxation responses, and daily living of migraine patients

Suyeon Lee, MME, MT-BC
Kyonggi Education Center for Autistic Children

The purpose of this study was to investigate the effect of music listening, autogenic training, and music-assisted autogenic training on the quality of life, physiological and psychological relaxation responses, and daily living in a population of migraine patients. Forty migraine patients, ranging 20 to 60 years, were referred to the researcher by their physicians and participated in the study. A convenience control-group pretest-posttest design was employed. The participants were randomly assigned to one of four groups: music listening (ML), autogenic training (AT), music-assisted autogenic training (MAT), or a control group participants, with n = 10 participants per group. The participants in experimental groups received four 30-minute sessions with an assigned treatment, once a week during a 4-week experiment period. The participants in the control group continued their regular medical treatment as prescribed by the doctor without receiving any other relaxation treatment. However, they were still aware of the research and their responsibilities for the study. The Migraine Assessment (MIDAS) and Migraine-Specific Quality of Life (MSQOL) questionnaire were used to investigate a migraine patients' quality of life collected before and after the 4-week experiment for all subjects. The physiological and psychological relaxation responses of migraine patients were measured by relaxation levels and forehead temperature recorded before and after each treatment session for the participants in three treatment conditions. The effect of the relaxation treatments on daily living of migraine patients was examined through the frequency and intensity of migraine headaches, and the amount of medication taken for migraine headaches during the 4-week experiment as recorded in participants' diary for all participants. The results found significant differences from pre- to posttest on the MIDAS, MSQOL, and relaxation levels while no significant was found among the groups. The analysis of forehead temperature showed no significant difference from pre- to posttest and among the groups. A one-way ANOVA was performed on the frequency, intensity, and amount of medication taken for migraine headaches during the 4-week experiment period. While results yielded no significant difference among the groups, the data indicate that the participants in the three treatment groups reported fewer migraine headaches, lower degrees of headache intensity, and less medication taken for migraine headaches than participants in the control group. A conclusion drawn from this study is that music listening itself as a relaxation treatment, or as an adjunct to other relaxation techniques can be effective in the treatment of migraine headaches.

[Keyword] Migraine, Headache, Autogenic training, Music listening, Relaxation

A migraine headache, one of these most common headaches, attacks significant portion of the population. In the United States, it is estimated that migraine headaches affect as many as twenty four million people a year. Approximately 18% of women and 6% of men experience at least one migraine attack each year. More than three million women and one million men have reported that they have one or more severe headaches every month (Robinson, 1999). The occurrence of migraine headaches has an enormous impact on society as well as individuals due to missed workdays and loss of productivity. It has been estimated that the direct and indirect costs of migraine headaches to American industry are approximately seventeen million dollars annually (Clinch & Hebert, 2001). The significant amount of money is spent to treat migraine patients who suffer from different types of migraine headaches.

Typically, a migraine headache is a throbbing type of headache, often occurring on one or both sides of the head. However, migraine headache is distinguished from other types of headache by its unilateral feature affecting only one side of the head (Sifton, 2001). Migraine headaches can be classified as either classic or common migraines. About 20% of migraine sufferers experience classic migraines in which pain is preceded by an aura, a peculiar sensation. Migraine auras include visual disturbances, speech disturbances, hallucinations, affective states, and mood disorders. Visual disturbances, the most common symptom of classic migraine, include blurred vision, blindness, flashing lights or dots, numbness, and a feeling of heaviness, and glittering zigzag lines (Robinson, 1999). The rest of migraine sufferers experience the common migraines which are not accompanied by an aura. Symptoms of both migraine headaches include gastrointestinal distress like nausea and vomiting, diarrhea, lack of appetite, abdominal cramping, dizziness, anxiety, depression, mental cloudiness, irritability, and food cravings (Shifton, 2001). The pain from both classic and common migraine usually occurs in the front of the head and develops over five to thirty minutes and last from several hours to a day or longer (Robinson, 1999).

The causes of migraine headaches are not yet completely understood. Nevertheless, there are three possible factors for the cause of migraine: physiology, genetics, and triggers such as emotions, foods, medications, hormones, physical exertion, and stress (Robinson, 1999). Some believe that constriction and dilation of blood vessels cause migraine headaches (Sifton, 2001). The constriction of vessels in the head is thought to be the main cause of the aura of which accompanies classic migraines, as well as the nausea and vomiting associated with both types. The subsequent dilation of the vessels then leads to the pounding pain. Another possible cause of migraine headaches relates to genetics. A child of a migraine sufferer has approximately a 50% chance of developing migraine headaches. If both parents have migraine headaches, the potential chance for the child rises to 70% (Robinson, 1999). However, genetics only play a part for some migraine sufferers; many cases of migraines have no obvious familial basis. Although each individual has different conditions, common triggers for migraine headaches, as indicated by recent studies, include emotions, foods and eating patterns, sleeping, medications, hormones, physical exertion, and stress (Christiano, 2000). In addition, environmental factors and personal events may trigger migraine headaches.

Depending upon possible causes and triggers, most migraine headaches can be controlled by pharmacological and alternative treatments, although it is known that headaches cannot be completely cured. Many people obtain relief through pharmacological treatments which reduce acute pain or occurrences of headaches. In general, initial treatment for migraine headaches is pharmacological, either abortive, which is directed at acute headaches in progress, or prophylactic which seeks to prevent migraine occurrences (Barrett, 1999). For the former approach, over-the-counter pain relievers, such as aspirin, acetaminophen (i.e., Tylenol, Panadol), or ibuprofen (i.e., Motrin, Advil), are prevalently used to treat acute pain (Sifton, 2001). For prophylactic treatment of migraines, beta-blockers such as Tenormin, Lopressor, and Linderal are the most frequently used medications. Calcium channel blockers such as Cardizem, Dilacor, and Procardia are also helpful in treating migraine headaches prophylactically. In addition, antidepressants such as Elavil, Prozac, and Zoloft are often used to combat migraine headaches (Lobono, 2000). These medications can help to reduce pain and to prevent occurrences of headaches. However, such self-administered treatments present a high potential for excessive consumption which can result in serious side effects including nausea, constipation, diarrhea, light-headedness, dizziness, camps, anxiety, and fatigue (Sifton, 2001).

These possible side effects of pharmacological treatments along with such psychological reactions as stress, negative emotions, and change of personality encourage the research of alternative treatments treating migraine headaches. Yet, it is not intended to eliminate traditional pharmacological treatment, but to develop more effective treatment for treatment of migraine headaches. Such alternative treatments include acupuncture, biofeedback, chiropractic adjustments, herbal remedies, homeopathic remedies, massage, regular physical exercise, and relaxation techniques (Barrett, 1999).

Among these treatments, a wide range of relaxation treatments has been used to alleviate discomfort and anxiety in patients undergoing overt pain reactions or pain-inducing medical procedures (Achterberg, Kenner, & Casey, 1990; Egbert, Batit, Welch, & Bartlett, 1985). Moreover, it has been shown that relaxation, by eliciting physiological and psychological changes and stabilization in an individual, may decrease his or her perceptions of pain, reduce adverse stimulation caused by pain, decrease pain-related anxiety, and promote muscle relaxation at pain sources (Mathew, 1981). In the treatment of migraine headaches, the continued induction of various relaxation techniques also have resulted in significant reduction of symptoms.

Warner and Lance (1975) reported success n treating 12 migraine patients with muscular and mental relaxation. In their study, eight patients indicated a greater than 50% reduction in headache frequency. Moreover, Hay and Madders (1971) demonstrated the effectiveness of a relaxation treatment program in which 69 of 98 migraine patients showed a reduction in the frequency, severity, or duration of migraine attacks. Their program involved several applications of relaxation techniques, such as progressive relaxation, breathing, and imagery techniques. Another study by Luthe (1963) also showed successful treatment of migraine patients with autogenic relaxation training, which emphasizes sensations involving the autonomic nervous system such as warm hands, slow heart rate, a cool forehead, and a warm solar plexus.

Autogenic training, developed by Johannes Heinrich Schultz during 1920s, is a system of psychosomatic self-regulation that permits the gradual acquisition of autonomic control such as warm hands, slow heart rate, a warm solar plexus, and a cool forehead (Lindemann, 1973). Autogenic training has been regarded as having greater effects than other relaxation techniques on autonomic measures and disorders associated with autonomic dysfunction (Lehrer & Woolfolk, 1993). Researchers have shown that the specific suggestions regarding warmth, heaviness, and so forth in autogenic training may be more successful in producing these sensations than other forms of muscular focused training (Shapiro & Lehrer, 1982). For migraine headaches, therefore, autogenic training is more often used because it involves autonomic conditions such as cool forehead which is associated with a reduction of migraine headaches. Studies with the combination of autogenic training and skin temperature biofeedback (Andreychuk & Skriver, 1975; Diamond & Montrose, 1984) or autogenic training alone (Stambaugh & House, 1977) have obtained encouraging results with migraine patients.

In other relaxation training studies, music listening itself or in combination with other relaxation techniques has demonstrated its beneficial aspect to enhance physical and psychological relaxation. Music is often used by individuals to assist with the relaxation process. Often time, this type of music which is particularly composed to facilitate relaxation refers to so-called "relaxing music" and pervades various everyday setting (Byrnes, 1996). In a broad classification of music styles, so-called "relaxing music" falls into sedative music since it is mostly slow, quiet, melodic and loosely structured. It is strongly believed by a number of researchers that sedative music has rendered positive results in reducing physiological arousal and enhancing a sedative emotional state (Gaston, 1951; Scartelli, 1982).

Fisher and Greenberg (1972) found that sedative music, which is often soft, slow-tempo music, can be effective in reducing anxiety and facilitating relaxation that can decrease pain perception (Peretti & Swenson, 1974). Furthermore, Smith and Morris (1976) suggest that physiological and emotional arousal may be decreased by listening to sedative music supporting Gaston’s (1951) assertion that sedative music produces a restful physiological state.

The literature of research on music and relaxation has indicated several characteristics of sedative music that are key used in inducing a relaxed response such as lowered heart rate, regular deep breathing, and muscular relaxation. The following is a summarization of several studies which have defined their selection of music for relaxation in more detail (Robb, Nichols, Rutan, Bishop, & Parker, 1995).

The characteristics of music include tempo, rhythm, melody, pitch, dynamics, harmony, and tone. Slow to moderate tempos are mostly recommended for relaxation. More specifically, tempo should be at or below a resting heart rate; 60 beats per minute (bpm) is most commonly cited, with 72 bpm being cited as the upper limit. The most desirable rhythm should be regular, smooth, and flowing without sudden changes. While slow, sustained melodies and progressed by step are most favorable. Pitch should be predominantly low to support relaxation, as high pitched sounds generally lean to elicit tension. The beneficial range of dynamics falls in soft to moderate loudness. Edwards, Eagle, Pennebaker, and Tunks (1991) propose that soft music (less than 65 dB) is an important component that resulted in decreased heart rate and conductance levels. Gradual and predictable changes in dynamics are also emphasized. With some disagreement on the use of harmony, more researchers suggest benefits of harmonic consonance and use of harmonic cadences (Updike, 1990; Edwards, Eagle, Pennebaker, & Tunks, 1991). Finally, the most suggested instruments are those with a softer tone quality, such as flutes, wind instruments, strings, and piano and voice. Synthesizers can also be used to produce such tones (Edwards, Eagle, Pennebaker, & Tunks, 1991; White, 1992).

Through its clamming qualities and smoothing effects, sedative music has consistently produced positive results in reducing pain perception and facilitating relaxation within medical or dental settings (Standley, 1986). According to the study by Hanser, Larson, and O'Connell (1983), the use of music and/or white noise has successfully helped more than 5,000 patients suppress pain regardless of different medical settings. It is also shown that music can lower heart rate and blood pressure by reducing the release of catecholamines, and causing the release of natural pain relieving endorphin (Coughlin, 1994).

Furthermore, music can reduce pain perception by distracting patients and inducing body relaxation. Clark and colleagues (1981) stated that the music is a stimulus for active focal point and the patient is instructed to focus on the music. Outcomes of a study by Davis (1992) regarding the use of music to reduce pain perception confirm that music plays a significant role in distracting the patient during the actual moment of extreme or acute pain. In addition to the distractor role, music has shown its effect in increasing relaxation by providing a strong rhythmic structure for breathing and release of muscular tension. This reduction of muscular tension causes significant decreases in oxygen consumption, respiratory rate, heart rate, muscle tension, and blood pressure (Cynthia 1992).

Positive results from the use of music as a pain suppressor, a distractor, and a relaxation agent have led to an increase in the applications of music as audioanalgesia for individuals in various medical treatments. McDowell (1966) found that obstetric patients who listened to music required a lower dosage of drugs compared to those who did not listen to music. Furthermore, Locsin (1981) reported that post-operative gynecologic and obstetric patients listening to music resulted in a produced significant reduction of pain reactions after surgery, and decreased the need for pain-relieving medication. According to Pole (1989), music can be used effectively with cancer patients in alleviating anxiety. More recent findings have indicated that music is effective not only by itself but also as an adjunct with other relaxation techniques in enhancing the efficacy of pain management, and that such parings may be more effective than any one treatment alone.

Music appears to promote the effects of other relaxation techniques (Bonny, 1989; Scartelli, 1989). Kibler and rider (1983) found that the combination of music and progressive relaxation may be more effective than either of these treatments separately. Another study showed greater psychological effects by the combination of relaxation music with autogenic suggestions than either technique alone, although there were no physiological differences among conditions (Chaloult, Borgeat, & Elie, 1988). Moreover, Peach (1984) reported that music combined with imagery and autogenic relaxation procedures when used with both psychiatric patients and normal participants produced a significant increase in skin temperature and perceived relaxation. The results from this, particularly changes in skin temperature which is one of primary goal of autogenic training, imply the possible application of music-assisted autogenic training to treat migraine headaches.

As discussed previously, that music can assist in the treatment of migraine headaches through its influence on the psychological and physiological aspects of individuals that are often factors of migraine headaches. In addition, music has been shown to be effective in reducing pain, stress, and anxiety; all of which frequently trigger migraine headaches (Lobono, 2000). Although it has been shown through a vast number of studies that music can enhance relaxation training, there was only one direct study that examines the effects of music and music-assisted relaxation training for the treatment of migraine headaches. This study, in fact, compared biofeedback-assisted relaxation training with classical music and without music (Klebenow, 1997). In Klebenow's study, a statistical significance was not obtained due to limited participant acquisition results; however, the results suggest that classical music may have a positive influence on increasing the participant's ability to relax, as demonstrated by finger temperature. Considering the involvement of biofeedback in Klebenow's study, there is no direct research related to the use of music listening and its combination with autogenic relaxation training for the treatment of migraine headaches. Therefore, the current study attempts to examine the effects of music listening, autogenic training, and music-assisted autogenic training on the quality of life, physiological and psychological relaxation responses, and daily living of migraine patients. The following research questions were investigated:

Question I: What is the effect of music listening, autogenic relaxation training, and music-assisted autogenic relaxation training on the mean scores from pretest to posttest on the Migraine Assessment (MIDAS) and the Migraine-Specific Quality of Life (MSQOL)?

Question II: What is the effect of music listening, autogenic relaxation training, and music-assisted autogenic relaxation training on the mean scores from pretest to posttest relaxation levels and forehead temperature?

Question III: What is the effect of music listening, autogenic relaxation training, and music-assisted autogenic training on the frequency and intensity of migraine headaches, and the amount of medication taken for migraine headaches during the 4-week experiment?

Methods

Participants

The participants (N=40) were males (n=4) and females (n=36) who have been diagnosed with and are suffering from migraine headaches. The participants were recruited from two cooperating institutions: Boramae Hospital and Seoul Asan Hospital, both located in Seoul, Korea. The participants were referred to the researcher by their physician for the treatment of migraine headaches. Criteria for participant participation were that participants: 1) be between the ages of 20 and 60; 2) have been experiencing more than one but fewer than six migraine headache each week; 3) have been suffering from migraine headaches for more than six months; 4) have migraine headaches without other types of headaches; 5) have migraine headaches not caused by other major diseases or brain disorders; and 6) have a normal aural ability. The researcher randomly assigned 40 participanst to one of four groups: music listening (ML), autogenic training (AT), music-assisted autogenic training (MAT), or a control group participants, with n = 10 participants per group. The participants in experimental groups received four 30-minute sessions with an assigned treatment, once a week for four weeks.

Dependent Variables

The independent variables were three different treatments: music listening, autogenic training, and music-assisted autogenic training.

Music listening (ML) : The participants were asked to lie down on an exercise mattress and listen to sedative relaxing music through the headphones with their eyes closed during the 30-minute sessions. The researcher set the volume of the music to a comfortable level for participants. The criteria for sedative relaxing music for the current study included: 1) a tempo at or below a resting heart rate (72 bpm or less); 2) a regular rhythm without sudden changes; 3) gradual predictable dynamics; 4) flowing melodic movement; 5) pleasing harmonies; and 6) tonal qualities or strings, flute, and piano (Robb, Nichols, Rutan, Bishop, & Parker, 1995).

The music was selected by the researcher on the basis of composer, publisher, or marketing claims that the music was composed specifically to relieve tension and induce a state of relaxation. For 30-minute cassette tapes were recorded, each containing six of the selections corresponding to the six different exercises in the autogenic training procedure. The researcher used a different tape to the subjects for each weeks session.

Autogenic training (AT) : AT is focused on functional systems including muscles, blood vessels, heart, breathing, inner organs, and the head (Lehrer & Woolfolk, 1993). AT consists of six standard exercises which emphasize specific body sensations involving the autonomic nervous system such as warming hands, slowing the heart rate, cooling the forehead, and warming the solar plexus. A tape with a complete instruction of AT was recorded by the researcher on a 30-minute cassette tape. The participants were asked to lie down on a mattress and were instructed to imagine the sensation in the exercise without making any movement or trying to speak or do anything else while listening to the instruction tape with earphones. The sequence of six standard exercises is as follows: 1) experiencing the heaviness of ones extremities; 2) experiencing the warmth of ones extremities; 3) regulating the heart; 4) regulating breathing; 5) regulating visceral organs; and 6) regulating the head. The script used for autogenic training in this study was developed by Lichstein (1988).

Music-assisted autogenic training (MAT) : As with AT, the participants were asked to lie down on a mattress and imagine the sensation in the exercise without moving or speaking while listening to the instruction tape with earphones. The instruction tape for this group was recorded with the identical script as that of the AT group, yet it included the music used in the ML group.

Dependent Variables

The dependent variables were the Migraine Disability Assessment Questionnaire, the Migraine-Specific Quality of Life, relaxation record, forehead temperature, and the frequency and intensity of migraine headaches, the amount of medication taken for migraine headaches.

The Migraine Disability Assessment (MIDAS) Questionnaire : The MIDAS Questionnaire, completed by migraine patients, the first time they visit their physician about migraine, provides valuable information to help physicians obtain suitable treatment for their patients headaches (AstraZeneca, 2002). This instrument is proven to be valid and reliable as a self-administered measure, used internationally in medical settings. The MIDAS consists of seven questions regarding patients migraine headaches over the preceding three months; patients responses help physicians to identify sufferers most severely affected by their migraine and in need of care. For the current study, the MIDAS was adapted to determine the patients' headache experiences from one month prior to the study, rather than the original instruments three-month period. The questions are answered numerically and classified into four grades of severity that predict the patients treatment needs. The MIDAS was distributed to each participant before and after the 4-week experiment, serving as pre- and posttest.

The Migraine-Specific Quality of Life (MSQOL) : The MSQOL was developed to measure how migraine affects physical and emotional functioning, and quality of life, which assesses feelings associated with migraine. This instrument has been utilized as a self-administered measure and has proven to be a useful tool internationally in clinical migraine research (Wagner, Patric, & Galer, 1996). The MSQOL is comprised of 25 questions that measure the impact of migraine on quality of life. The MSQOL was distributed to each participant before and after the 4-week experiment, serving as pre- and posttest.

Relaxation levels : Developed by Lichstein (1988), the relaxation record was used to compare psychological relaxation responses of the participants before and after the sessions. The subjects were asked to rate their level of relaxation on a relaxation record form using a 10-point scale from very aroused and upset to completely and deeply relaxed. Pre- and post-data of the relaxation level was analyzed to determine pre and posttest differences for significant change.

Forehead temperature : Immediately following the subjects completion of the relaxation record, the experimenter measured the participants' forehead temperature using a digital thermometer. This instrument was utilized to determine the effects of each condition on physiological relaxation responses of the participants before and after the treatment.

Migraine diary : Developed by Bakal (1982) as a record of headache frequency, the migraine diary was used to examine the influence of each condition on the daily living of migraine patients. The subjects were asked to record the frequency and intensity of migraine headaches and the amount of medication used for migraine headaches on a daily basis. The intensity of migraine headaches was recorded on a visual analog scale (VSA), a useful assessment technique for rating subjective phenomena such as relaxation and pain perception (Hersen & Bellack, 1988). The VAS consists of a horizontal 10 centimeter line with one end indicating the maximum and the other end the minimum of the variable to be measured. In this case, one end was identified as most severe pain, while the opposite end was labeled least severe pain. The participant indicated his or her intensity of pain by marking a point along the line each time they experienced a migraine headache. The distance from one of the anchors to the mark recorded by the patient was measured in millimeters. Each category of data (frequency, intensity, and amount of medication) was analyzed to find a mean score for each experimental group and the control.

Procedures

Prior to the initial session, the researcher obtained informed consent and administered the Migraine Assessment Questionnaire (MIDAS) and Migraine-Specific Quality of Life (MSQOL) to each participant. The MIDAS and MSQOL were distributed before and after the experiment, serving as pre- and posttest. The researcher randomly assigned 48 participants to one of four groups: music listening (ML), autogenic training (AT), music-assisted autogenic training (MAT), or a control group, with n = 10 participants per group.

The participants in the control group continued their regular medical treatment as prescribed by the doctor without receiving any other relaxation treatment. However, they were still aware of the research and their responsibilities for the study. The researcher obtained consent from the participants and then scheduled two more appointments to gather the migraine diary on a weekly basis. The MIDAS and MSQOL questionnaire were collected on the first meeting and again after 4 weeks from the first meeting. At the last meeting, each participant received the cassette tape on which the music-assisted autogenic training was recorded as an appreciation for his or her participation in the study.

After obtaining consent, the researcher met with each participant in experimental groups and scheduled session dates and times. The participants in the experimental groups received four individual sessions once a week for four weeks. Each treatment method was recorded on a tape and distributed to subjects for home practice. The researcher instructed the subjects to listen to the tape at least once a day.

Upon admittance to the office for each session, the participants in experimental groups received a relaxation record sheet where they rated their level of relaxation on a 10-point scale. These data served as a pretest which was compared to a score rated after an induction of the treatment. The researcher measured their forehead temperature using a digital thermometer. The participants were then asked to lie down on a mattress and encouraged to make themselves comfortable with their eyes closed. The participants in each experimental group then received a set of headphones and asked to listen to the tape until it finished.

To conclude the training procedures, the researcher instructed the subjects to count backwards from ten to one and then sit up. The researcher then distributed another relaxation record sheet to each subject and asked them to rate their level of relaxation. Immediately, the researcher collected the relaxation record sheet. Lastly, the researcher measured the participant's forehead temperature using a digital thermometer. The participants were asked to turn in their migraine diary each week.

Results

The purpose of this study was to explore the effects of music listening, autogenic training, and music-assisted autogenic training on the quality of life, physiological and psychological relaxation responses, and daily living of migraine patients. This chapter includes the results of the various statistical tests run on the data and tables to address each research question.

The MIDAS and MSQOL questionnaire were used to investigate the quality of migraine patients' lives. The physiological and psychological relaxation responses of migraine patients were measured by relaxation levels and forehead temperature. The effect of the relaxation treatments on daily living of migraine patients was examined through the frequency and intensity of migraine headaches, and the amount of medication taken for migraine headaches during the 4-week experiment as recorded in participants' diaries.

Question I: What is the effect of music listening, autogenic relaxation training, and music-assisted autogenic relaxation training on the mean scores from pretest to posttest on the Migraine Assessment (MIDAS) and the Migraine-Specific Quality of Life (MSQOL)?

A one-way ANOVA was performed and revealed no significant difference between the groups' mean scores in either pretest or posttest on both questionnaires. The results from performing the Wilks' Lambda test showed a significant difference from pre- to posttest on the MIDAS scores for the music listening group ($F(1, 9) = 11.57$, $p < .05$), the autogenic training group ($F(1, 9) = 6.57$, $p < .05$), and the music-assisted autogenic training group ($F(1, 9) = 20.37$, $p < .01$). No significant difference was found from pre- to posttest for the control group. The changes in pre- and posttest MSQOL scores also showed a significant difference for the music listening (F(1, 9) = 12.44, p < .05), the autogenic training group (F(1, 9) = 9.26, p < .05), and the music-assisted autogenic training group (F(1, 9) = 9.96, p < .05). No significant difference was found from pre- to posttest for the control group (p > .05). A one-way ANOVA revealed no significant difference among the four groups's the mean decreases from pre- to posttest on either the MIDAS or MSQOL scores. However, each group achieved a different mean decrease from pre to posttest on both the MIDAS and MSQOL. Table 1 shows data for the mean differences from pre- to posttest, standard deviations and probabilities of both questionnaires for each group. As shown in Table 1, the participants in the three treatment conditions (ML, AT, and MAT) achieved the greater mean decreases on both questionnaires compared to the control group, though not significantly so. For both questionnaires, the decreased scores in the posttest indicate an increased quality of life, implying that patients have reduced the negative influence of migraine headaches in their lives.

Table 1.
Pretest to Posttest Mean Differences for the MIDAS and MSQOL

Group/Dependent V ariable		Pretest	Posttest	MD	SD	*t*	*p*
ML	MIDAS	33.15	26.30	6.85	6.37	3.40	.01
	MSQOL	67.00	57.10	9.90	8.87	3.53	.01
AT	MIDAS	33.70	27.80	5.90	7.28	2.56	.05
	MSQOL	66.10	59.20	6.90	7.17	3.04	.01
MA T	MIDAS	34.40	24.20	10.20	7.15	4.51	.01
	MSQOL	66.00	66.10	9.80	9.82	3.16	.01
C	MIDAS	34.75	28.95	5.80	9.51	1.93	.09
	MSQOL	66.10	61.90	5.80	4.20	1.90	.09

Note : ML = Music Listening, AT = Autogenic Training, MAT = Music-assisted Autogenic Training, C = Control, MD = Mean Difference.

Question II: *What is the effect of music listening, autogenic relaxation training, and music-assisted autogenic relaxation training on the mean scores from pretest to posttest on the relaxation level and forehead temperature measures?*

A one-way ANOVA was performed and revealed no significant difference between the groups' mean scores in either pretest or posttest on relaxation levels and forehead temperature measure. The Wilk's Lambda test revealed a significant difference from pre- to posttest on the relaxation levels for the music listening group (F(1, 9) = 73.56, p < .001); the autogenic training group (F(1, 9) = 8.84, p < .05); and the music-assisted autogenic training group (F(1, 9) = 81.00, p < .001). The analysis of forehead temperature revealed no significant difference from pre- to posttest for any group (F(1, 27) = 3.23, p > .05). A one-way ANOVA found no significant difference between the three treatment groups' mean changes from pre- to posttest for either the relaxation level or forehead temperature measures. Since measurements of both relaxation levels and forehead temperature were components of the treatment procedures, no data were obtained for those measures for the control group, which did not receive any type of relaxation treatments.

Although no statistically significant difference was found between the groups, each group achieved a different mean change from the pre- to posttest on relaxation levels and forehead temperature. Table 2 shows data for mean differences from pre- to posttest, standard deviations and probabilities of relaxation levels and forehead temperature for each group. According to Table 2, the music listening group achieved the greatest mean increase from pre- to posttest on the relaxation levels, while the music-assisted autogenic training group achieved the greatest mean decrease from the pre- to posttest on forehead temperature, though not significantly so. For the relaxation levels, the increased scores in the posttest indicate that the participants increased their psychological relaxation responses after the treatments. For forehead temperature, the decreased scores in the posttest indicate that participants increased their physiological relaxation responses after the treatments.

Table 2.
Pretest to Posttest Mean Differences for Relaxation Level and Forehead Temperature

Group/Dependent Variable		Pretest	Posttest	MD	SD	*t*	*p*
ML	RL	5.09	7.26	-2.18	.80	-8.58	.0 01
	FT	97.68	97.55	.12	.29	1.34	.10
AT	RL	4.83	6.10	-1.27	1.36	-2.97	.01
	FT	97.73	97.55	.17	.33	1.65	.10
MAT	RL	5.30	7.40	-2.10	.74	-9.00	.0 01
	FT	97.63	97.35	.33	.12	2.45	.10

Note : RL = Relaxation Level, FT = Forehead Temperature.

Question III: What is the effect of music listening, autogenic relaxation training, and music-assisted autogenic training on the frequency and intensity of migraine headaches, and the amount of medication taken for migraine headaches during the 4-week experiment?

The one-way ANOVA compared the means of each measure for the groups and revealed no significant difference among the groups for each measure (frequency, intensity, and medication). Although no treatment effects were observed, each group achieved different means for each measure. Table 3 shows the mean comparisons for each measure, based on the data collected from patients' migraine diaries. The means of the three measures for the treatment groups were lower than those of the control group, though not significantly so. The participants in the treatment conditions reported fewer migraine headaches, lower degrees of headache intensity, and less medication taken for migraine headaches than participants in the control group. The lower the scores were on each measure, the fewer the symptoms of migraine headaches experienced in participants' daily living.

Table 3
Descriptive Statistics for Treatment Effects

Group/Dependent Variable		M	SD
ML	Frequency	7.10	3.90
	Intensity	5.95	1.71
	Medication	.71	.67
AT	Frequency	7.30	4.71
	Intensity	6.27	1.62
	Medication	.76	.58
MAT	Frequency	6.90	4.23
	Intensity	5.78	1.21
	Medication	.70	.66
C	Frequency	7.60	4.35
	Intensity	6.98	1.52
	Medication	.87	.61

Discussion

The purpose of this study was to examine the effect of music listening (ML), autogenic training (AT), and music-assisted autogenic training (MAT) on the quality of life, physiological and psychological relaxation responses, and daily living of migraine patients. The results showed that there were significant differences from pre- to posttest on the MIDAS and MSQOL for all three treatment groups (ML, AT, MAT). There were no significant mean decreases from pre- to posttest on both MIDAS and MSQOL scores for the control group. A one-way ANOVA revealed no significant mean decreases between the four groups. while no significant was found among the groups.

These results indicate that the participants who received any type of relaxation treatments improved their quality of life to some degree. Moreover, the three treatment conditions (ML, AT, MAT) yielded a significant mean increase from pre- to posttest on relaxation levels although no significant mean changes were found between the three groups. There was no significant difference between pre- and posttest on forehead temperature measure. In measures of frequency, severity, and amount of medication taken for migraine headaches, each group showed different means, although not statistically significant. The data indicate that the participants in the treatment conditions reported fewer migraine headaches, lower degrees of headache intensity, and less medication taken for migraine headaches than the participants in the control group.

In the comparison of the three experimental conditions, the music listening and music-assisted autogenic training conditions achieved greater mean changes from pre to posttest in a positive direction for all dependent variables than that of the autogenic training. The findings from this study imply that music can facilitate other relaxation techniques, since the music-assisted autogenic relaxation condition yielded greater mean changes in a positive direction for all dependent variables than the autogenic relaxation condition.

As discussed previously, the results of this study indicated that music listening itself as a relaxation treatment, or as an adjunct to other relaxation techniques can be effective in the treatment of migraine headaches. This study also supports that sedative music can increase psychological and physiological relaxation responses, which is vital in the treatment of migraine headaches. Consequently, the results imply that relaxation treatments can improve the quality of life, psychological and physiological relaxation responses, and daily living of migraine patients.

The present study and other research in the literature review validate the beneficial effects of music listening and relaxation methods in treating pain perception and enhancing relaxation responses. The methods of treatment may also produce positive outcomes when used with patients who are experiencing other types of pain.

Limitation

The primary limitation of the study was the use of a small convenience sample. Due to limited participant acquisition, the results of this study cannot be generalized to a larger population. Another limitation might be the "Hawthorne" or "halo" effects, defined as the possible influence of subjects' awareness of participating in a research or treatment, rather than different methods. There may have been a confounding effect from what is known as contemporary history if the subjects experienced any specific event, such as additional therapies or different medical treatment, between relaxation treatment sessions. During the 4-week experiment period, some of participants may experience different medical treatment. Medication changes could not be controlled nor was the researcher always informed of such changes. Patients in the control group may have benefited as a result of their regular medical treatment, although they did not receive any form of relaxation training. However, randomized assignment of participants generally controls for such factors, since it is assumed that each group included patients whose medical treatment was changes by their physician.

Another limitation of the study was the settings for the treatment sessions which were the physicians' offices in each hospital. Interruption were unavoidable. Some music therapy sessions were interrupted by a nurse, doctor, or other medical staff. Interruptions may have been decreased by posting a sign on the door of an office; however, the researcher in a hospital setting must be expected and prepared to handle any interruption.

Recommendations for the Future Research

Suggestions for future studies include obtaining a larger sample size for each condition. Another way to increase the power of significance is utilizing subjects as their own control group if one fails to obtain the larger sample size.

Future research efforts may focus on the possible implications of these relaxation techniques for individuals with other diagnoses accompanied by pain perception, stress, or anxiety. In addition, the influence of participant-selected versus experimenter-chosen music on pain perception and relaxation responses may be an area for future research. Several studies with different populations have shown the positive effects of participant-selected music over experimenter-chosen music (Hanser, 1985; Hekmat & Hertel, 1993). Participants' ability to select the music or control the volume of music may increase relaxation responses of patients in a variety of medical settings. However, there has been no documentation to support such effects in the population with migraine patients. It is also recommended to examine the effects of different types of music or specific elements of music such as rhythm, melody, harmony, dynamics, or frequency, on relaxation responses with this population.

The live versus recorded instruction of autogenic training would be an additional variable to examine. There are a few studies that indicate some more influential effects of live instruction in autogenic training over recorded instruction (Luthe, 1963; Lichstien, 1988). However, due to the setting of the present study, the recorded instruction was used so that headphones would block noises from outside of the room or other interruptions.

Furthermore, examining the effect of these relaxation treatment on other physiological responses such as heart rate, respiration rate, blood pressure, and EEG may be valuable for further investigation. Future researchers might also substitute a more advanced thermometer, which might yield more subtle changes in forehead temperature than the instrument used in this study.

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