THE EFFECT OF MUSIC THERAPY ON ANXIETY AND PAIN IN INDIVIDUALS WITH TYPE 2 DIABETES WHO JUST STARTED INSULIN THERAPY

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Abstract

This study, it was purpose to evaluate the impact of music therapy on anxiety and pain caused by insulin injections in individuals with diabetes whose insulin begins for the first time. The sample of the randomized controlled study was formed of 57 people. Individuals were separated into two groups: the intervention group and the control group. Descriptive Characteristics Form, State-Trait Anxiety Scale and Visual Pain Scale were used to collect data. Music therapy was applied to the intervention group as well as routine practices during diabetes education. Routine interventions were made in the control group. State anxiety scale scores in the intervention group were found to be lower than the baseline scores after music therapy. Also, the intervention group's state anxiety and pain scores after the music therapy were lower than the control group. Music therapy has made a positive contribution to reducing insulin anxiety and pain. Based on the research results, the use of music therapy in addition to routine practices is recommended.

Keywords: Anxiety, Diabetes, Music Therapy, Nursing, Pain.

İNSÜLİN TEDAVİSİNE YENİ BAŞLAYAN TİP 2 DİYABETLİ BİREYLERDE MÜZİK TERAPİSİNİN KAYGI VE AĞRI ÜZERİNE ETKİSİ

Öz

Bu çalışmada, insülin tedavisine ilk kez başlayan diyabetli bireylerde müzik terapinin insülin enjeksiyonunun neden olduğu kaygı ve ağrıya etkisinin değerlendirilmesi amaçlandı. Randomize kontrollü çalışmanın örneklemini 57 kişi oluşturdu. Katılımcılar müdahale ve kontrol grubu olarak ikiye ayrıldı. Verilerin toplanmasında Tanımlayıcı Özellikler Formu, Durumluk-Sürekli Kaygı Ölçeği ve Görsel Ağrı Ölçeği kullanıldı. Müdahale grubuna diyabet eğitimi sırasında rutin uygulamaların yanı sıra müzik terapisi uygulandı. Kontrol grubuna rutin uygulamalar yapıldı. Müdahale grubundaki durumluk kaygı ölçeği puanlarının müzik terapisi sonrası başlangıç puanlarına göre daha düşük olduğu görüldü. Ayrıca müdahale grubunun uygulama sonrası durumluk kaygı ve ağrı puanları kontrol grubuna göre daha düşüktü. Müzik terapi insülin kaygısını ve ağrıyı azaltmaya olumlu katkı yaptı. Araştırmanın bulgularına dayanarak rutin uygulamalara ek olarak müzik terapinin kullanımı önerilmektedir.

Anahtar Kelimeler: Anksiyete, Diyabet, Müzik Terapisi, Hemşirelik, Ağrı.

1. INTRODUCTION

The prevalence of diabetes is growing worldwide. Due to this fact and the consequence of diabetes, it has become a growing health problem. Prevention of complications through glycemic control is the very notable objective of diabetes management (1). Timeful starting of insulin to maintain glycemic control and prevent complications is critical in diabetes management (1, 2). However, most individuals with diabetes have anxiety and negative perceptions of insulin (3). Individuals with diabetes are reluctant to start insulin because of the thought that it will restrict their life, that they will have to use it continuously, and the fear of hypoglycemia. They are also reluctant to use insulin due to their fear that it is harmful and the expectation of pain associated with the injection (4). This situation leads to delays in insulin treatment and consequent negative outcomes in diabetes (5). For this reason, it is very important to allocate sufficient time to address the concerns of individuals regarding insulin, persuade them to use insulin, and support them with appropriate approaches (5, 6).

Music therapy is frequently used to increase treatment adherence and reduce pain and anxiety (7, 8, 9). Since ancient times, many civilizations have used music therapy to treat physiological and psychological problems (10). Studies have shown that music has affirmative influences on health (11, 12). It is expected that the results obtained from the study will be beneficial to individuals with diabetes and their healthcare team in overcoming insulin-related anxiety and pain. At the same time, it is thought that the study findings will contribute to diabetes management and the literature. The study aimed to determine the impact of music on pain and anxiety in patients with diabetes who are new to insulin.

2. METHODS

2.1. Types of Study

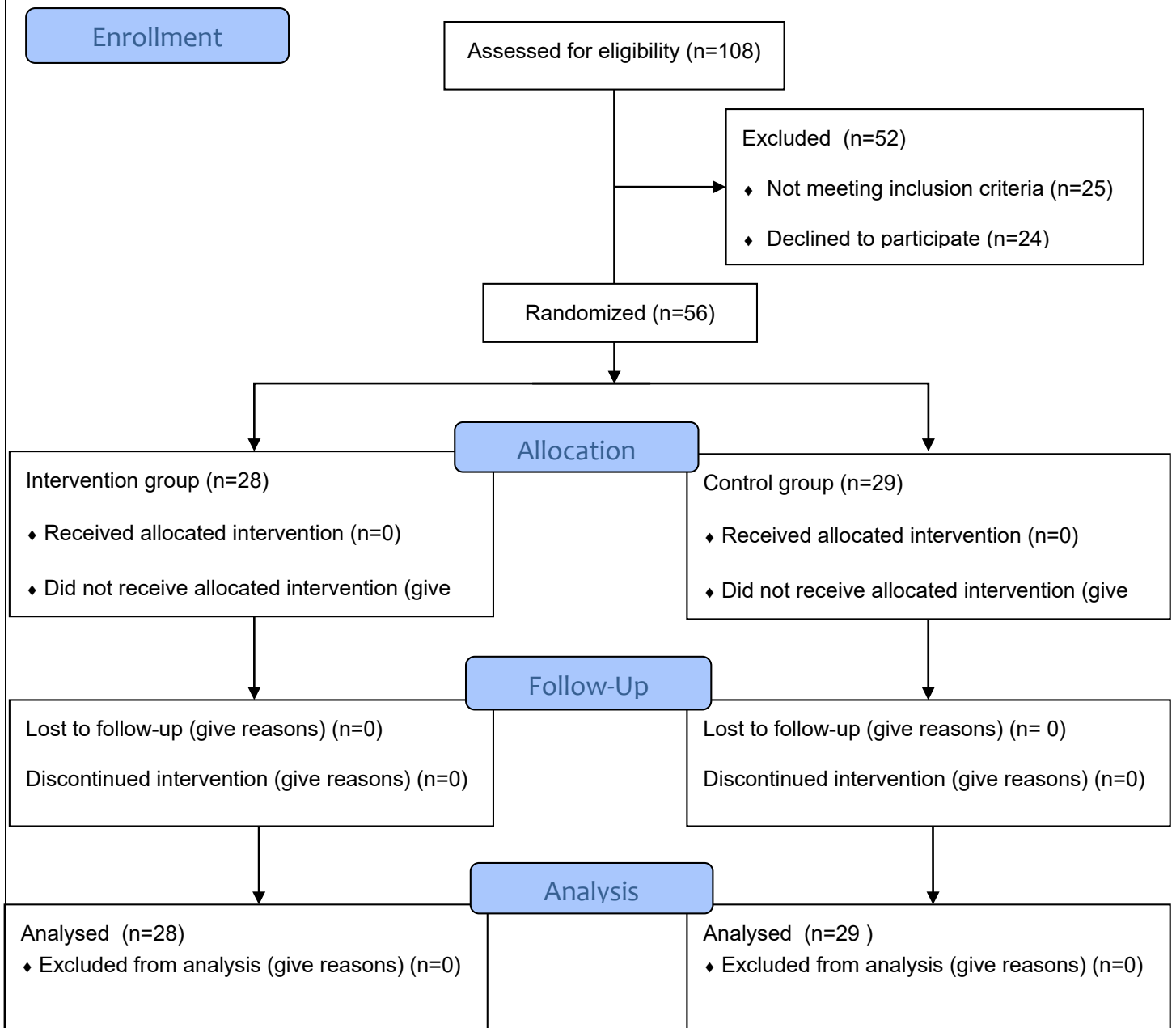The research is a randomized controlled experimental trial.

2.2. Setting and Sample

This study was performed at Bolu Abant Izzet Baysal University Izzet Baysal Training and Research Hospital between August 2021 and September 2022. The research population consisted of 108 individuals with type 2 diabetes who applied to the internal diseases outpatient clinic, and the sample consisted of 56 individuals. The sample size was detected by power analysis. The power of the research was 80%, the type I error level (α) was 0.05, the confidence interval was 95%, the effect size was at least 0.45, and the sample size was 56 (13). The study was finalized with 28 people in the intervention group. It was completed with 29 people in the control group.

2.3. Randomization

Randomization was done by a software program (14). Participants were numbered according to the order in which they were admitted to the polyclinic. They were assigned to either the intervention or the control group based on their number in the randomization list (Figure 1). The homogeneity of groups was homogeneous in points of age, duration of diabetes diagnosis, and gender was statistically evaluated after randomization.

Figure 1. Consort Flow Diagram

Enrollment

Assessed for eligibility (n=108)

Excluded (n=52)
- Not meeting inclusion criteria (n=25)
- Declined to participate (n=24)

Randomized (n=56)

Allocation

Intervention group (n=28)
- Received allocated intervention (n=0)
- Did not receive allocated intervention (give

Control group (n=29)
- Received allocated intervention (n=0)
- Did not receive allocated intervention (give

Follow-Up

Lost to follow-up (give reasons) (n=0)

Discontinued intervention (give reasons) (n=0)

Lost to follow-up (give reasons) (n= 0)

Discontinued intervention (give reasons) (n=0)

Analysis

Analysed (n=28)
- Excluded from analysis (give reasons) (n=0)

Analysed (n=29)
- Excluded from analysis (give reasons) (n=0)

2.4. Inclusion and Exclusion Criteria

Inclusion Criteria: 18 years old and older; having a diagnosis of type 2 diabetes; no hearing impairment; with place and time orientation; insulin therapy for the first time; individuals who volunteer.

Exclusion Criteria: Having problems with speaking and comprehension; those with a diagnosis of psychiatric illness.

Hypotheses of the Study:

H_{1-1}: Music therapy applied to individuals with diabetes who start insulin treatment for the first time is effective in reducing anxiety.

H_{1-2}: Music therapy applied to individuals with diabetes who start insulin treatment for the first time is effective in reducing pain due to insulin injection.

2.5. Data Collection

Descriptive Characteristics Form, Visual Pain Scale, and State-Trait Anxiety Scale were used to collect data. Descriptive Characteristics Form, Spielberger State-Trait Anxiety Scale were applied to both groups before the intervention. Visual Analog Scale and State Anxiety Scale were applied after the intervention.

2.5.1. Descriptive Characteristics Form: This form contains information about socio-demographic characteristics, disease and risk factors. This form consists of a total of 19 questions. Sociodemographic characteristics consist of 10 questions (age, gender, marital status, etc.). 9 questions are related to diabetes (diabetes diagnosis time, HbA1c value, presence of diabetes in the family, presence of diabetes complications, etc.).

2.5.2. Spielberger State-Trait Anxiety Inventory (STAI): The scale has two subsections (15):

State Anxiety Scale: It is a scale intended to measure how an individual is feeling at the moment. The total score is 20-80. A high value indicates a high level of anxiety (15). In the current study, the baseline Cronbach alpha value was found to be 0.885 and the post-procedure Cronbach alpha value was 0.884.

Trait Anxiety Scale: It shows how an individual is feeling regardless of the situation or condition. The total score is 20-80. A high value indicates a high level of anxiety (15). In the current study, the Cronbach alpha value was = 0.747.

2.5.3. Visual Analog Scale: The horizontal form of the scale was used to assess pain. The pain scale ranges from 0 to 10, starting with 'no pain' and ending with 'unbearable pain'. The individual is asked to mark the level of pain on the line between the two extremes (1-4 points= mild pain, 5-6 points= moderate pain, 7-10 points= severe pain) (16).

2.6. Interventions

2.6.1. Intervention Group: During the diabetes education, music therapy was applied to the participants in addition to routine monitoring and follow-up interventions. Turkish Folk Music, Classical Music, Turkish Classical Music, and Sufi Music were presented as options and listened to throughout the process. Expert opinion was also obtained from a faculty member of the Music Department at the Faculty of Fine Arts. Thus, the types of music were all selected to be instrumental, non-verbal, arranged to have the same rhythm and duration at 70 decibels, and approximately 60 metronomes per minute. The instrumental music genres were loaded into the computer before the study. The participants were listened to from the loudspeaker throughout the diabetes education.

2.6.2. Control Group: During the diabetes education, the participants were followed up and given routine intervention. For consistency, insulin needles of the same brand, length, and width were used for all participants. No intervention was performed during routine follow-up and treatment.

2.7. Data Analysis

Data were analyzed in SPSS20. Descriptive statistics are expressed as arithmetic mean, frequency, median, standard deviation, median, and minimum-maximum. Conformity to the normal distribution was examined with the Kolmogorov-Smirnov test. Parametric data were assessed as arithmetic mean, standard deviation, and Independent Sample T test for independent groups; the Paired sample test was used for dependent groups. Categorical data were analyzed with the Chi-square test. $p<0.05$ was considered statistically significant. The effect size was examined with Cohen d (Cohen d: 0.2 small effect, Cohen d: 0.5 medium effect, d: 0.80 high effect) (13).

2.8. Ethical Statement

Permission for the study was acquired from the Bolu Abant Izzet Baysal University Clinical Research Ethics Committee (27.04.2021, 2021/96). Institutional permission was also obtained from the institutions where the research was conducted. Written consent was handled by the participants before the study.

3. RESULTS

3.1. Results of Descriptive Characteristics

Information on the descriptive characteristics of the participants is included in Table 1. No significant distinction existed among the group's descriptive characteristics (Table 1).

Table 1. Characteristics of Participants (n=57)

Characteristics	Intervention Group (n=28, %49.1)	Control Group (n=29, %50.9)	All Participants (n=57)	p value
n (%)¹				
Gender				
Female	18 (%50.0)	18 (%50.0)	36 (%63.2)	0.862
Male	10 (%47.6)	11 (%52.4)	21 (%36.8)	
Marital Status				
Single	4 (%66.7)	2 (%33.3)	6 (%10.5)	0.423**
Married	24 (%47.1)	27 (%52.9)	51 (%89.5)	
Employment Status				
Unemployed	21 (%52.5)	19 (%47.5)	40 (%70.2)	0.434
Employed	7 (%41.2)	10 (%58.8)	17 (%29.8)	
Perceived Income Level				
Income is less than expenses	5 (%55.6)	4 (%44.4)	9 (%15.8)	
Income equals expenses	16 (%47.1)	18 (%52.9)	34 (%59.6)	0.900
Income exceeds expenses	7 (%50.0)	7 (%50.0)	14 (%24.6)	
Exercise				
Yes	9 (%75.0)	3 (%25.0)	12 (%21.1)	0.056
No	19 (%42.2)	26 (%57.8)	45 (%78.9)	
Presence of Chronic Disease				
Yes	11 (%44.0)	14 (%56.0)	25 (%43.9)	
No	17 (%53.1)	15 (%46.9)	32 (%56.1)	
Coronary artery disease	3	3	6	
Hypertension	7	10	17	
Heart failure	1	0	1	0.494
Chronic renal failure	1	1	2	
Asthma	1	0	1	
Ankylosing spondylitis	0	1	1	
Hyperthyroidism	0	1	1	

Diabetes Complication Status				
No	22 (%48.9)	23 (%51.1)	45 (%78.9)	
Yes	6 (%50.0)	6 (%50.0)	12 (%21.1)	0.945
Retinopathy	1	1	2	
Neuropathy	4	5	9	
Neuropathy	5	4	9	
Music Listening Status				
Yes	5 (%35.7)	9 (%64.3)	14 (%24.6)	
No	23 (%53.5)	20 (%46.5)	43 (%75.4)	
Folk music	9	5	14	0.248
Art music	3	3	6	
Mysticism	6	2	8	
Arabesque	0	2	2	
All kinds	10	10	20	

[1]= Chi-square test; * statistically significant;   **= Fisher-exact test

3.2. Pre- and Post-Intervention Outcomes on Anxiety Within Groups

The state anxiety points of the music therapy intervention group after music therapy were significantly lower than the baseline scores with a high effect size ($p<0.001$). There was no significant distinction between the state anxiety points of the control group ($p>0.05$) (Table 2).

Table 2. Pre- and Post-Intervention Outcomes on Anxiety Within Groups (n=57)

Variables	Music Therapy Group (n=28, %49.1)	Control Group (n=29, %50.9)	All Participants	p-value
$\overline{X} \pm ss^1$				
Age (years)[1]	56.00±9.69	55.86±14.05	55.96±11.86	0.983
Height (cm)[1]	163.75±10.50	163.25±8.85	163.53±9.54	0.864
Weight (kg)[1]	87.57±16.97	81.29±12.58	84.32±15.02	0.109
BMI (kg/m²)	31.71±4.97	30.28±4.93	30.98±4.96	0.278
Exercise Time (minute)[1]	45.56±7.83	40.00±17.32	44.17±13.95	0.575
Diabetes Diagnosis Duration (years)[2]	6.30±7.83	6.98±6.49	6.65±7.12	0.724
HbA1c (%)[1]	10.69±2.82	8.73±1.81	10.21±2.28	0.076
Trait Anxiety Total Points[1]	47.25±9.85	47.76±9.49	47.51±9.58	0.843
SAI Baseline Total Point[1]	43.82±11.30	37.59±8.10	40.65±10.21	**0.020***
SAI Total Points after Intervention[1]	28.54±7.14	39.07±9.77	33.89±10.03	**<0.001***
Visual Analog Scale (VAS)[3]		**n (%)**		
Mild pain (1-4 points)	4 (%25.0)	12 (%75.0)	16 (%28.1)	**0.023***
No pain (0 points)	24 (%58.5)	17 (%41.5)	41 (%71.9)	

BMI= Body mass index; HbA1c= glycosylated hemoglobin; SAI=State Anxiety Inventory; [1]= Independent Sample T Test (Mean±standard deviation); [2]= Mann Whitney U test (Median (min-max)); [3]= Chi-Square test (n (%)) ; *= Statistically significant.

3.3. Pre- and Post-Intervention Outcomes on Anxiety, And Pain Between Groups

The groups had no significant distinction in trait anxiety points ($p>0.05$). The baseline state anxiety points of the music therapy group were higher than those of the control group ($p= 0.02$). The state anxiety points of the music therapy group after intervention were considerably lower than the points of the control group ($p<0.001$). The pain points of the intervention group was lower than the mean pain points of the control group ($p= 0.02$) (Table 3).

Table 3. Pre- and Post-Intervention Outcomes on Anxiety, And Pain Between Groups (n=57)

Variables	Music Therapy Group (n=28, %49.1)	Control Group (n=29, %50.9)
	$\overline{X} \pm ss^1$	
SAI baseline total point	43.82±11.30	37.59±8.10
SAI total point after music therapy	28.54±7.14	39.07±9.77
p-value	<0.001*	0.275
cohen d	1.35	-

[1]= Paired Sample T Test (Mean±standard deviation); *= Statistically significant

4. DISCUSSION

In this study, the efficacy of music on insulin injection-induced pain and anxiety in individuals with diabetes who had recently started insulin were investigated. According to the study results, music therapy applied during diabetes education significantly reduced the pain and anxiety associated with insulin injections. Anxiety and pain points of the music therapy group were found significantly lower after the intervention compared with the control group. In addition, although the baseline anxiety score of the intervention group was statistically significantly higher than that of the control group, the after-intervention state anxiety score was found to be significantly lower than that of the control group. Research results are similar to the literature (17, 18, 19). Reluctance to start insulin is frequently seen in individuals with diabetes. When starting insulin therapy, individuals with diabetes may have some attitudes and prejudices. That is; lack of knowledge about insulin and diabetes, the idea that insulin is unnecessary, the fear that insulin is harmful, and the belief that they will depend on insulin forever (20). At the same time, resistance to starting insulin is encountered due to reasons such as the belief that insulin will lead to hypoglycemia and weight gain, social stigma, perception of starting insulin because their illness is severe (20), anxiety regarding potential pain due to injection, and restricted life (21). All of these factors can lead to delayed initiation of insulin therapy and problems with adherence (20). This situation negatively affects glycemic control and diabetes management (22). It is also associated with psychological comorbidities, impaired general health, increased complications of diabetes, increased risk of mortality, and ineffective coping (23). Despite advances in insulin needle technology that minimize pain, individuals with diabetes still have high levels of anxiety (5, 24). Practices such as application on a model, and demonstrating the injection process are crucial for breaking the negative attitudes towards this matter (3, 25). At the same time, a collaborative approach, explaining the unfavourable sensations of insulin as well as its benefits (25, 26) and supporting it with appropriate strategies are recommended (3, 25). Music is frequently used as a supportive care practice in the control of pain and anxiety, and positive results have been observed. It is stated that music therapy is efficient in reducing the psychological effects and stress-related outputs such as anxiety, restlessness, and irritability (9). In another study; researchers have obtained significant results on cortisol levels, blood sugar levels, and physiological parameters, and it is suggested that music therapy can be used as a complementary approach (27). Music therapy is also used to manage acute, procedural, cancer-related, and chronic pain (28, 29). It is also widely used in pain control during interventional procedures and positive results are obtained (30, 31).

In the literature, no studies have been evaluating the influences of music on pain and anxiety caused by insulin injections. However, this technique has been applied in different areas of diabetes yielding positive results. In a study examining the impacts of music on depression and glucose in diabetes, significant effects on anxiety and HbA1c levels were determined (32). A positive effect was also found in the study examining the impact of music therapy on diabetic foot ulcer management (33). Music therapy has also been applied to neuropathic pain (7).

4.1. Limitations

The results of the study are valid for this sample group. It does not generalize to the entire universe. In the study, the effect of music therapy during insulin administration was evaluated.

5. CONCLUSION AND RECOMMENDATIONS

In the present study, individuals with diabetes who had just started insulin therapy listened to music during the diabetes education. Listening to music has a favorable impact on reducing pain and anxiety. Music therapy is an easy-to-use, safe, and cost-effective intervention. Based on the study results, it is recommended for use in addition to conventional interventions in the management of anxiety and pain in people who have recently started insulin therapy. However, further studies with high-level evidence are needed to assess the effects and benefits. In future studies, it is thought that it will be useful to evaluate the effect during the first insulin administration and subsequent applications.

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