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Research Article

Does Music therapy alleviate schizophrenia and schizoaffective related negative symptoms? A Matched Case-Control Study

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Abstract:

Objective: Music therapy has been used in several mental disorders. This research aimed to assess the influence of music therapy on depression and the adverse symptoms found in individuals with schizophrenia and schizoaffective disorder.

Methods: This matched case-control research examined a cohort of 80 individuals who had been diagnosed with both schizophrenia and the depressed subtype of schizoaffective disorder. The intervention group participated in five 1-hour music listening sessions of their choosing from a selection over four weeks, in addition to receiving pharmaceutical therapy. The control group alone got the pharmaceutical intervention. The researchers used the Beck Depression Inventory and the Scale for Assessment of Negative Symptoms (SANS) questionnaires to assess depression and negative symptoms in both groups.

Results: The two groups had similar demographics and baseline data. Both groups saw a significant improvement in depression and negative symptoms. Nevertheless, the intervention group exhibited a more noteworthy improvement. The intervention group showed a 57.67% improvement in depression levels, a 60.20% improvement in anxiety scores, and a 45.19% improvement in negative symptoms scores. In comparison, the control group only showed a 20.20% improvement in depression scores, a 25.09% improvement in anxiety scores, and a 10.66% improvement in negative symptoms values.

Conclusion: Our research indicates that music listening sessions has a notable positive impact on anxiety, sadness, and negative symptoms in individuals diagnosed with schizophrenia and the depressive subtype of schizoaffective disorder.

Keywords: music therapy; schizophrenia; schizoaffective; anxiety; depression; negative symptoms

Introduction

Schizophrenia, often known as SCH, is a very debilitating psychiatric disorder that has significant impacts on both patients and their families. Positive, negative, and generic symptoms categorize the symptoms of schizophrenia [1]. In addition, individuals diagnosed with schizophrenia often have concurrent mood symptoms, such as either mania or sadness [2]. Researchers have linked adverse symptoms to a reduced quality of life, poor social and overall functioning, and a decline in cognitive ability [3].

Schizoaffective disorder (SAD) is a mental illness defined by the coexistence of significant emotional and psychotic symptoms [4].

Music therapy (MT) is an interpersonal approach that involves using music and its many components (such as sound, rhythm, melody, and harmony) to assist the client in addressing their physical, psychological, social, and cognitive requirements [5]. Contemporary music therapy methods primarily draw on psychoanalytical, humanistic, cognitive-behavioral, and developmental ideas [6]. MT is implemented using many methodologies. We can categorize approaches in music therapy based on their mode of action (active or passive), the amount of structure used, and the focus of attention [7]. Active music therapy approaches include the active participation of both the therapist and the client, who engage in

music-making using musical instruments and their voices. During passive music therapy, the client remains at rest while the therapist plays music, encouraging the patient to undergo targeted mental states [8]. The level of organization may also vary. Certain therapists use a greater degree of organization than others, either by using more organized methods of music composition or by pre-selecting activities before the sessions instead of allowing them to evolve via interaction with the client. The degree of predetermined organization may be contingent upon the client's requirements, but it may also fluctuate based on different music therapy frameworks [7]. Implementing music therapy is straightforward and has no adverse effects [9]. This leads to solid compliance and positive treatment results [10].

Prior research has investigated the impact of MT as a supplementary therapy to conventional care. The results of this research indicate that music therapy improves the general condition, reduces negative symptoms, alleviates depressive characteristics, and reduces anxiety. Additionally, sufficient music therapy sessions may enhance social functioning [7]. Furthermore, there were also reports of reduced hospital stays, higher sleep quality, and improved daily life functioning [11].

Listening to music considerably impacts the brain's emotional regulation and social response functions. This includes the limbic and paralimbic regions [12]. Listening to enjoyable music may elicit positive feelings by triggering the release of dopamine in the brain's reward circuit [13]. Additionally, listening to music may stimulate the release of endorphins, which are also associated with mood regulation. Music preference significantly impacts listening, as people choose pieces they are already familiar with [14]. Despite the widespread use of music therapy and music listening among patients worldwide, further research is necessary to understand the therapeutic benefits in our country. This is due to the potential influence of cultural variations, which may lead to diverse outcomes. The current study aims to examine how music listening affects negative symptoms and depression in patients with schizophrenia and schizoaffective disorder admitted to Roozbeh Hospital, Tehran's primary psychiatric referral center. This study builds upon previous research that has demonstrated the effects of music on mood. In contrast to earlier research that used Western classical music, we opted for Eastern and traditional Persian music to provide a more effective means of contact with the participants.

Materials and Methods

This research used a matched case-control design to compare the intervention and control groups before and after the intervention. The study included a total of 80 patients, 40 females and 40 males, diagnosed with schizophrenia and schizoaffective disorder (depressive subtype) and admitted to Roozbeh Hospital in Tehran, Iran. The attending psychiatrists determined the diagnosis according to the DSM-5 criteria [15]. Patients between the ages of 20 and 50 diagnosed with schizophrenia and the depressed subtype of schizoaffective disorder and hospitalized for a minimum of three days met the inclusion criteria. We disqualified participants if they exhibited severe aggressive behavior that interfered with group music sessions, had previously undergone music therapy or other psychological interventions (such as analytic psychotherapy or cognitive-behavioral therapy) within the last three months, or possessed professional music expertise. We enrolled patients who met the specified inclusion criteria. We included age, sex, length of sickness, number of hospitalizations for psychiatric reasons, profession, and education. Our research adhered to the standards outlined in the Declaration of Helsinki at every stage. We upheld the privacy and confidentiality of information from medical records and other procedures. We assigned a unique code to each patient to safeguard their information and maintain their anonymity. We used these codes throughout all phases of data collection and statistical analysis. The primary project researchers were solely responsible for gathering the data. The medical ethics committee has authorized the research approach. Patients were not subject to any extra expenses. The standard medical therapy for patients remained unchanged. We obtained written informed consent from all patients and their legal guardians to participate in the research.

We recruited individuals from four mental inpatient units for our research. We selected a male intervention group from male ward No. 1 and a male control group from male ward No. 2. We followed the same procedure for the female patients. We used ward separation to keep the patients unaware of the presence of the control and intervention groups, each receiving different treatments. Each group consisted of 20 patients. We predicated the research design on comparing the two parallel groups before and after intervention. The intervention group underwent a four-week music therapy program consisting of five weekly sessions, each lasting one hour. Patients collectively listened to recorded music throughout each session. The patients autonomously chose the music selections from a list of recommendations. After 45 minutes of playing the music, the patients engaged in a 15-minute discussion, sharing the emotions they had experienced throughout the session. These patients not only received music listening sessions but also received hospital care and conventional antipsychotic or mood stabilizer drugs. The study director (KK) oversaw these open groups. During the same time frame, the control group only got traditional therapy and medical attention. A seasoned and skilled music composer and performer recommended the musical compositions.In this research, we aimed to recommend cheerful and traditional music, specially chosen from the ***Mahur*** and ***Homayun Dastgah***, two musical modal systems in traditional mugham music. These ***Dastgahs*** are part of the seven ***Dastgahs*** of Persian music. The three essential components of joyful music are a rapid tempo, positive lyrics or poetry, and a significant scale. We executed the compositions relatively briskly, ranging from 110 to 120 beats per minute. The music in the intervention groups had similarities based on the listed characteristics; however, they were not identical. The research director supervised the therapy sessions. The research director punctually performed the music and invited the patients to express their emotions and anticipations before and after the session. The therapy's primary objectives were to enhance verbal and non-verbal interpersonal communication, raise motivation, foster a sense of purpose and optimism, improve mood, and enhance emotions of pleasure, among other goals. We used the Scale for Assessment of Negative Symptoms (SANS) and the Beck Depression and Anxiety Questionnaire to assess these parameters. These assessment tools have been validated for use by the Iranian community.

The Beck Depression Inventory consists of 21 questions, each of which identifies one symptom associated with depression. The total scores might vary from 0 to 63. You can complete the task independently or with the help of an experienced interviewer. It indicates the patient's mood and behavior during the last fourteen days. The scoring system for this test categorizes scores from 0 to 10 as "without symptoms," 10 to 18 as mild depression, 19 to 29 as moderate depression, and values from 30 to 63 as severe depression [16].

We obtain the total score by summing the replies to the 21 questions in the Beck Anxiety Inventory. The next step involves classifying the score: We classify the anxiety levels in the following order: We classify anxiety

levels 1-7 as non-anxiety, 8-15 as mild anxiety, 16-25 as moderate anxiety, and 26-63 as severe anxiety.

We use the Scale for Assessment of Negative Symptoms (SANS) to evaluate schizophrenia's negative symptoms. It has 25 questions that cover five broad areas. We assign a score of 0 to 5 to each item, indicating the intensity of the symptom. The research director (KK) completed these questionnaires for all patients.

We analyzed the research data using the SPSS program, specifically version 21.0. Quantitative variables that follow a normal distribution were represented using the mean and standard deviation (SD), whereas qualitative variables were defined using frequency (%). Given that the questionnaires consisted of multiple-choice questions using the Likert scale, we used bivariate or multivariate comparison tests such as the paired T-test, independent samples T-test, chi-square, Wilcoxon, Friedman, Man-Whitney, and Kruskal-Wallis tests. All analyses deemed a p-value of 0.05 to be statistically significant.

Results

This study conducted a clinical trial at Roozbeh Hospital, Tehran, Iran, with 40 patients with schizophrenia (SCH) and social anxiety disorder (SAD) as the intervention group and another 40 patients with SCH and SAD as the control group. Table 1 displays the demographic characteristics of the research participants.

		Study Group		Total
		Intervention n (%)/ Mean ± SD	Control n (%)/ Mean ± SD	
Sex	Female	20(50)	20(50)	40
	Male	20(50)	20(50)	40
Occupation	Unemployed	26(65)	31(77.5)	57
	Governmental	3(7.5)	0(0.0%)	3
	Private	11(27.5)	9(22.5)	20
Level of Education	Less than High-school Diploma	24(60)	30(75)	54
	High-school Diploma	7(17.5)	5(12.5)	12
	More than High-school Diploma	9(22.5)	5(12.5)	14
Age		36.07±6.11	34.65±5.3	35.36±5.71
Disease duration		6.11±2.81	6.20±3.45	6.15±3.13

Table 1. The distribution of demographic characteristics in each study group

In the intervention group, the average duration of the illness was 6.11 years, whereas in the control group, it was 6.20 years. The provided information corresponds to Table 1. 50% of the patients in the intervention and control groups experienced fewer than two hospitalizations. (Table 2)

		Group		P-value
		Intervention (n=40)	Control (n=40)	
Depression Score	Pre-intervention	17.07 ± 8.71	15.12 ± 6.54	.261£
	Post-intervention	6.70 ± 3.46	12.82 ± 4.77	<.001£
	Degree of improvement	- 8.50 (-13.5, -5.0)	-1.00 (-4.0,0.0)	<.001€$

£ The comparison of the mean between-group scores using the Independent Sample T-test

$The comparison of the mean between-group scores using the Mann-Whitney test

€ The comparison of the mean intragroup scores (pre- and post-intervention) using the Paired Samples T-test showed significant improvement in two groups.

Table 2. Depression score comparison between the two groups before and after intervention

We conducted an independent sample t-test to compare the mean depression scores between two groups: the intervention group and the control group. The results indicated that after the intervention, there was a statistically significant difference in the mean depression ratings between the two groups (P-value. 001).

We conducted a paired samples T-test to compare the mean depression score in the study follow-up for each group. The results indicated that there was an improvement in depression ratings for both groups. Based on the Independent Samples T-test, the intervention group that received music therapy saw a substantially more significant decrease in depression levels compared to the control group. The p-value is less than 0.001. (Table 3)

		Group		P-value
		Intervention (n=40)	Control (n=40)	
Anxiety Score	Pre-intervention	13.40 ± 6.06	11.65 ± 4.93	.161£
	Post-intervention	5.42 ± 3.21	10.07 ± 4.55	<.001£
	Degree of improvement	-7.00 (-10.0,-5.0)	-2.00(-2.7,0.0)	<.001€$

£ The comparison of the mean between-group scores using the Independent Sample T-test

$The comparison of the mean between-group scores using the Mann-Whitney test

€ The comparison of the mean intragroup scores (pre- vs. post-intervention) using the Paired Samples T-test showed significant improvement in two groups.

Table 3. Anxiety score comparison between the two groups before and after intervention

We conducted an independent sample t-test to compare the mean anxiety scores in the intervention and control groups. The results indicated a statistically significant difference (P-value. 001) in the mean anxiety levels between the two groups after the intervention, in contrast to the pre-intervention comparison.

We conducted a paired samples t-test to compare the mean anxiety scores before and after the intervention in each study group. The results indicated that the intervention and control groups substantially improved anxiety levels throughout the study (P-value =.001 and P-value =.005, respectively). Nevertheless, the intervention group had a much greater rate of improvement in anxiety scores compared to the control group, as seen in Table 4.

		Group		P-value
		Intervention (n=40)	Control (n=40)	
Negative symptoms score	Pre-intervention	30.30 ± 11.10	29.27 ± 7.13	.625£
	Post-intervention	16.75 ± 7.81	27.00 ± 7.01	<.001£
	Degree of improvement	-13.55 ± 6.41	-2.27±3.60	<.001€$

£ The comparison of the mean between-group scores using the Independent Sample T-test

$The comparison of the mean between-group scores using the Mann-Whitney test

€ The comparison of the mean intragroup scores (pre- vs. post-intervention) using the Paired Samples T-test showed significant improvement in two groups.

Table 4. Negative symptoms score comparison between the two groups before and after intervention

We conducted an independent sample t-test to compare the mean score for negative symptoms in the intervention and control groups. The results showed that in the post-intervention period, there was a statistically significant difference in the mean scores for negative symptoms between the two groups (P-value =.001) compared to the pre-intervention period (P-value =.625).

We saw a substantial enhancement in the opposing sign score during the post-intervention phase compared to the pre-intervention period. The p-value is less than 0.001, as seen in Table 5.

	Groups	N	Mean (%) ± SD	P-Value
Depression score improvement	Intervention	40	57.56 ± 18.21	< .001
	Control	40	20.20 ± 17.40	
Anxiety score improvement	Intervention	40	60.20 ± 20.85	< .001
	Control	40	25.09 ± 20.89	
Negative symptoms improvement	Intervention	40	45.19± 15.64	< .001
	Control	40	10.66 ± 9.64	

Table 5. the comparison of the percentage of improvement in depression, anxiety and negative symptoms scores (%) means in the control and intervention group

Independent Samples T-tests revealed a statistically significant difference in the total improvement rate between the intervention group and the control group, with the intervention group demonstrating a greater rate of progress. The p-value is less than 0.001, as seen in Table 6. An Independent Sample T-test was conducted to compare the mean anxiety scores in the intervention and control groups. The results revealed a statistically significant difference (P-value<.001) in the mean anxiety levels between the two groups after the intervention, in contrast to the comparison before the intervention. A Paired Samples T-test was conducted to compare the mean anxiety scores before and after the intervention in each study group. The results indicated that the intervention and control groups significantly improved anxiety levels throughout the study (P-value<.001 and P-value=.005, respectively). Nevertheless, the anxiety level improvement rate was substantially more significant in the intervention group than in the control group (Table 4).

An Independent Sample T-test was conducted to compare the mean score for negative symptoms in the two intervention and control groups. The results revealed that in the post-intervention period, there was a statistically significant difference in the mean scores for negative

symptoms between the two groups (P-value<.001), as compared to the pre-intervention period (P-value=.625).

We saw a significant improvement in the opposing sign score during the post-intervention phase compared to the pre-intervention period. The p-value is less than 0.001, as seen in Table 5.

The results of the Independent Samples T-tests indicate that the intervention group had a substantially greater improvement rate than the control group. The p-value is less than 0.001, as seen in Table 6.

Discussion

The current study evaluated the efficacy of music therapy, specifically music listening, in treating people diagnosed with schizophrenia or depressive subtypes of schizoaffective disorder. Our observations indicate that music listening has a notable positive impact on sadness, anxiety, and negative symptoms in individuals diagnosed with schizophrenia or schizoaffective disorders.

Both the case and control groups saw improvement during the trial. However, our study found that music listening had a more significant impact on alleviating sadness, anxiety, and unpleasant symptoms compared to the control group. The intervention group had a considerably greater rate of improvement in these three parameters than the control group.

Recent publications have presented a growing body of evidence supporting the positive effects of music therapy on depression and anxiety. In research conducted by Chen et al. in 2017, it was shown that anxiety and depression levels were considerably lower in the group that received music therapy compared to the control group [17].

Other research has shown that music therapy significantly impacts unpleasant symptoms. In 2021, Jia et al. published a study indicating that music therapy significantly improved the undesirable symptoms experienced by patients [18].

The use of music therapy in addition to standard treatment has moderate-quality evidence, according to a 2017 meta-analysis [10].

A 2021 study, in line with our research results, demonstrated that simply listening to music can have similar effects as music therapy. There was no difference in negative symptoms between the two groups. Additionally, both groups saw a notable reduction in negative symptoms [19].

Regarding the influence of music therapy on individuals diagnosed with schizophrenia or schizophrenia, several studies have acknowledged the role of other variables, such as gender, in determining this influence. In line with our research, Mohammadi et al. conducted a survey indicating that music therapy had a more significant impact on female patients than male patients, as shown by the higher overall score reached [20]. Talwar et al.'s study revealed a substantial reduction in negative symptoms of schizophrenia among male patients who received music therapy, compared to their female counterparts, despite previous studies indicating a more positive overall effect of music therapy on female patients [21]. Based on various and conflicting research results, more assessment is required to determine the influence of gender and other potential variables on this issue.

Although music therapy is widely used worldwide, only a few studies have been conducted nationally. Furthermore, cultural disparities may result in diverse outcomes. Therefore, we have chosen to undertake this research as a groundbreaking exploration of the therapeutic use of music listening for patients who have schizophrenia and schizoaffective disorder in Iran.

Limitations

There were several constraints in our investigation. Initially, we did not assess and examine the individuals diagnosed with schizophrenia and schizoaffective disorder as distinct groups, as our primary objective was to focus on the broader use of music therapy. In our research, we did not compare solitary and group music therapy. One further constraint of our study was the absence of a comparison between group music therapy and any other kind of group therapy. We can solely attribute some of the reported consequences to the group effect.

Recommendation for future studies

Future comparative investigations should further investigate the differential effects of individual and group music therapy. In addition, doing independent analyses on self-help groups and music therapy groups, as well as on individuals with schizophrenia and schizoaffective disorder, may provide more easily understandable findings.

Conclusion

Our research findings indicate that music therapy has a substantial impact on reducing anxiety, sadness, and negative symptoms in patients with schizophrenia and depressive subtypes of schizoaffective disorders, as compared to the control group.

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Compliance With Ethical Standards

Ethical approval was obtained from the Ethical Committee of Tehran University of Medical Sciences, and the ethics code is IR.TUMS.MEDICINE.REC.1399.499

Conflict of interests

There was no conflict of interest.

Data availability

The datasets produced or examined during the research may be obtained from the corresponding author upon a reasonable request.

Informed Consent

Consent for study participation was obtained from all patients and their legal guardians.

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