

A Study of the Effects of Music Therapy on Negative and Positive Symptoms in Schizophrenic Patients

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Abstract

Background: Music therapy may have an effect on mental illnesses. This is an exploratory, quasi-experimental study to compare the impact of music therapy on negative and positive symptoms in patients with schizophrenia.

Method: 96 participants were randomly assigned to either a control group or two experimental groups. The experimental group 1 received active music therapy (individual and group playing, improvisation, singing, and movement), while the experimental group 2 received passive music therapy (listening to recorded music) in weekly sessions over a period of 1 month. The control group 3 did not receive any music therapy sessions. Outcome measures included scales for the assessment of negative and positive symptoms.

Results: Both types of music therapy had significant effects on the composite score for negative symptoms ($P < .05$) in comparison with the positive symptoms score, and on one important subscale of negative symptoms, namely, anhedonia-asociality ($P < .01$). Also, results showed some interesting variations, which overall point to more pervasive and deeper effects of active and passive types of music therapy on female participants ($P < .01$).

Conclusions: Music therapy may have beneficial effects on negative and positive symptoms of residual type of schizophrenia (German J Psychiatry 2012; 15(2): 56-62).

Keywords: schizophrenia, negative and positive symptoms, music therapy

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Introduction

Schizophrenia is a highly complex, elusive, and intriguing psychiatric disorder, which has defied easy understanding ever since its formal diagnosis by Bleuler (1911). Its symptomology is complex and its aetiology is not completely understood. On the therapeutic front, innumerable therapies have been tried, based on a variety of models, including biological, psychological and socio-cultural ones. Schizophrenia is characterized by abnormalities in the perception or expression of reality. Distortions in perception may affect all five senses, including sight, hearing, taste, smell, and touch, but the most commonly manifest symp-

tom are auditory hallucinations, paranoid or bizarre delusions, or disorganized speech and thinking with significant social or occupational dysfunction. Onset of symptoms typically occurs in young adulthood (Castle, 1991).

According to DSM-IV-TR, types of schizophrenia are defined by predominant symptoms at the time of the most recent evaluation and therefore may change over time. These types include the paranoid type, in which preoccupation with delusions or auditory hallucinations is prominent; the disorganized type with disorganized speech and behaviour, and flat or inappropriate affect are prominent; the catatonic type, in which characteristic motor symptoms are prominent; the undifferentiated type, which is a nonspecific category used when none of the other subtype features are predominant;

and the residual type, in which there is an absence of prominent positive symptoms but continuing evidence of disturbance (e.g., negative symptoms or positive symptoms in an attenuated form). Although the prognostic and treatment implications of these subtypes vary, the disorganized type tends to be the most severe and the paranoid type to be the least severe (American Psychiatric Association, 2000).

Andreasen (1984) developed criteria for dividing schizophrenic syndromes into three subtypes – positive, negative and mixed. Positive schizophrenia is characterized by prominent delusions, hallucinations, positive formal thought disorder, and bizarre behaviour. Negative schizophrenia is typified by affective flattening, alogia, avolition-apathy, anhedonia-asociality and attention impairment. In mixed schizophrenia, both or neither negative and positive symptoms are prominent.

In this regard, DSM-IV-TR (American Psychiatric Association, 2000) criteria for schizophrenia organize symptoms into two primary categories: positive symptoms and negative symptoms. Positive symptoms represent the presence of distortions in thought content (delusions), language and thought process (disorganized speech), and self-monitoring behaviour (grossly disorganized or catatonic behaviour). Negative symptoms reflect an absence or loss of normal functions. Negative symptoms include a restricted range of emotional expressiveness (affective flattening), decreased fluency and productivity of speech (alogia), and an inability to initiate and persist in goal-directed activities (avolition). Additional symptoms include a loss of pleasure or interest (anhedonia) and social withdrawal and isolation.

The treatment most commonly used is neuroleptic medication (Johnstone, 1988), and although conventional antipsychotic drugs are effective in the treatment of positive symptoms in schizophrenia, negative symptoms of schizophrenia are more resistant to drug treatment (Lieberman, 1988).

Music has a profound effect on body and psyche. It is an indispensable part of the human experience and an essential component to achieving quality of life (Dileo & Bradt, 2009), making music therapy a helpful tool for health. Music therapy has been demonstrated to be a beneficial intervention for people who have enduring mental illness (Grocke, 2008; Edwards, 2006). Music therapy can be regarded as one form of psychosocial rehabilitation because it can enhance social cohesiveness, and can affect an individual's psychological and physiological well-being, such as cognitive functioning and emotional expression (Yang, 1998). It is defined as a psychotherapeutic method that uses musical interaction as a means of communication and expression (Gold, 2009).

Peng et al. (2010) and Sousa and Sousa (2010) found that music therapy is an effective tool for the improvement and rehabilitation of symptoms of schizophrenia when used as an adjunct to pharmacotherapy. In a study that compared standard care plus music therapy to standard care alone, results showed that music therapy helps to improve symptom level (Gold, 2007). Hayashi et al. (2002) also found effects of music therapy on negative symptoms and quality of life. In a meta-analysis, it was found that music therapy has a positive effect on general symptoms and negative symptoms (Gold, 2005). Talwar et al. (2006) and Ulrich et al.

(2007) also found positive effects of music therapy on negative symptoms. Additionally, Na and Yang (2009) showed a statistically significant decrease in the frequency of auditory hallucinations and a significant decrease for negative symptoms after listening to music. Also, a meta-analysis study of the effects of music therapy indicated that music therapy had a minimal effect on positive symptoms and a moderate to large effect on general symptoms depending on treatment type, duration, chronicity, and measurement type, and that such therapy had a small to large effect on negative symptoms, depending on provider of treatment (Cercone, 2008).

These findings suggest that music therapy may be helpful in the treatment of patients with schizophrenia. Most studies on the effect of music therapy have been conducted in Western countries. As a result, we were interested in performing the present study with Iranian traditional music therapy in order to find out whether the same effects could be obtained.

A brief history of music therapy in Iran

Persia has been one of the few countries which have persistently maintained its identity and individuality through the ages, a fact reflected in its classical music. Archaeological evidence reveals that musical instruments were used in Iran during the Elamite era around 800 BC. Not much is known about Persian music in the ancient world, especially concerning the music of the Achaemenian Empire. The Persian philosopher and music theorist al-Farabi, known as Alfarabi in Europe, dealt with music therapy in his books. He discussed the therapeutic effects of modes of music on the soul. The Persian music that is applied in therapeutic moods is based upon a modal system; music relies on improvisation and composition and is based on a series of modal scales and tones, which must be memorized, and the priority is given to ornamentation. The scales are divided into more than twelve semi-tones. Therefore, melodies are concentrated on a relatively narrow register and motive repetition at different pitches and vocal parts is often decorated with *Tahrir*, a vocal ornamentation similar to yodelling. Persian classical music continues to function as a spiritual and healing tool as it has throughout its history. The incorporation of mystic texts as lyrics was replaced by lyrics largely written by medieval Sufi poets, especially Hafez and Jalal-e Din Rumi (Safvate, 1966). Instruments used in Persian classical music include the bowed spike-fiddle *Kamancheh*, the goblet drum *Tombak*, the end-blown flute *Ney*, the frame drum *Daf*, the long-necked lutes *Tar*, *Setar*, *Tambur*, and *Dotar*, and the dulcimer *Santur* (Farhat, 1990).

The Iranian Music Therapy Association was founded in 2001 by Ali Zadeh Mohammadi and his colleagues to increase public awareness of the benefits of music therapy as well as the progressive development of research and clinical practice. The Association holds different workshops and courses for students, health care practitioners, and other interested parties. Working with children who suffer from behaviour disorders, autism spectrum, and abuse and trauma are our priorities.

Table 1: Frequency distribution of patients according to diagnosis in each group

Diagnosis (Type of schizophrenia)	Experimental Group 1		Experimental Group 2		Control Group		Total (n = 96)
	Female (n =11)	Male (n =24)	Female (n =12)	Male (n =15)	Female (n =13)	Male (n =21)	
Paranoid	9	13	7	12	9	13	63
Residual	1	5	4	3	3	4	20
Undifferentiated	0	5	0	0	1	3	9
Disorganized	1	0	0	0	0	1	2
Catatonic	0	1	1	0	0	0	2

n = sample size

The present study examines the effects of music therapy on positive and negative symptoms of schizophrenia, and keeping in view the focal theme of this study, the following hypotheses are formulated:

- Music therapy in general will have a significant effect on negative symptoms of schizophrenia when compared to positive symptoms
- The effect of music therapy will differ by gender
- Music therapy will differ with different types of schizophrenia

Methods

Participants

In this exploratory, quasi-experimental study, 96 schizophrenic participants were drawn from the main psychiatric hospital in Tehran. They were randomly assigned to three groups: the experimental group 1 (N = 35), the experimental group 2 (N = 27), and a control group (N = 34). The patients' age ranged from 20 to 50 years, with a mean of 34.6 (SD = 8.05) years. The experimental groups were given music therapy combined with neuroleptic medication, while the control group was given neuroleptic medication alone. The diagnosis of schizophrenia was based on DSM-IV. The participants whose case record showed the diagnostic label of schizophrenia (paranoid, disorganized, catatonic, undifferentiated and residual types) as the first possibility were included in the study. The participants who initially had the diagnosis of schizophrenia but were subsequently found to have other psychiatric illnesses were excluded from the study. The frequency distributions of the participants, according to diagnosis, are given in Table 1.

The design of the present study involved a comparison of the post test performance of experimental and control groups. In order to judge the significance of the difference between post test means obtained for different scores for the three groups, the ANCOVA was performed for the total sample and different subsamples. T-ratios were computed to find the significance of means of different groups whenever F-ratio was found to be significant. They are also given in the tables. All participants gave their written consent for this study. This study received University Research Ethics Committee and Ministry of Education approval.

Measures

Assessments of participants were conducted after their conditions had stabilized six days after admission on average. Tests were performed at the beginning and the end of the study to compare the changes between the groups. All of the participants were interviewed and rated pre and post test using Andreasen's rating scales, namely, Scale for the Assessment of Negative Symptoms (SANS) and Scale for the Assessment of Positive Symptoms (SAPS).

The inter-rater reliability and internal consistency of the SANS were reported to be high (Andreasen, 1984). It was shown that the total subscale score and composite score for all items have a higher reliability than the individual items. The reliability coefficients obtained for different subscales are more than moderate and fairly satisfactory, averaging around .77. Mean reliability coefficients assessed separately for the negative and positive symptoms subscales were computed to be .78 and .77, respectively. These coefficients are comparable with those reported by other studies in this area.

Procedure

Experimental group 1 was exposed to active music therapy, wherein they participated in the actual playing of different musical instruments, singing together and making bodily movements according to the rhythm of the music. Experimental group 2 was exposed to passive music therapy, wherein the patients listened to stimulating music rather than playing any instrument. For the active groups, two music therapists planned and ran the music therapy sessions. Considering the individual conditions, needs, and interests of patients, they were involved and encouraged in musical activities such as group singing, playing as a musical group or improvisation and movement to music (Table 2). Both active therapies were conducted in a group setting and administered for one month. Subjects took part in the music therapy sessions in groups of five to eight.

The control group was not exposed to any music activities. All participants in the three groups continued to receive their regular medication. The study was conducted in a 6×10 (meters) room. The room was used for various patients' occupational activities, and included two tables and 12 chairs.

Table 2: Music therapy intervention for experimental group 1

Subscales	Patients' Requirements	Music therapy Intervention
Affective-flattening or blunting	Stimulation of feeling responses and appropriate affect	Group and individual singing, assisting patients to sing popular song lyrics
Avolition-apathy	Adequate interest and drive to pursue goals Persistence at work Increased energy level	Instrumental group improvisation Instrumental performance as a pleasant and attractive medium to stimulate motivation and appropriate activities Group and individual singing Movement interaction
Anhedonia-asociality	Interest in and enjoyment of activities Intimacy and closeness	Instrumental group and individual performance to produce a positive musical experience and group interaction Instrumental group improvisation Group and individual singing Rhythmic activities
Alogia	Appropriate verbal speech	Group and individual singing popular song lyrics Singing to evoke feeling responses Recreational music performance Group and individual rhythmic activities (Assess spontaneous movement to music)
Inattentiveness	Attention focusing and relaxing activities	Instrumental performance; playing melodic Orff instruments with only a few bars
Attentiveness	Attention focusing and relaxing activities	Singing familiar popular song while the therapist plays the melody
Hallucination	Reality testing on verbal and non-verbal levels Ability to cope with stress and tension	Group and individual singing Singing popular song lyrics Instrumental group activities (redirecting the patient's attention from internal events to interacting in musical activities)
Delusions And Positive formal thought disorder	Reality testing on verbal and non-verbal levels Trusting peers and feeling comfortable with others	Instrumental group improvisation Non threatening reality orientation through musical tasks
	Positive perception of others Outlet expressing negative feeling	Group and individual singing Movement to music (moving freely and spontaneously without rigidity to music)
Bizarre behaviour	Activities that stimulate social behaviour. Structured outlet for appropriate physical expression	Group singing Instrumental group and individual activities

Note: For experimental group 2, subjects were made to listen to Iranian music that was selected by either therapist or client in a group setting

A range of instruments were made available for the participants including: melodic Orff instruments: xylophone (soprano, alto, bass), metal-phone (soprano, alto, bass), Glockenspiel (soprano), rhythmic instruments: triangle, maracas, finger cymbal, tuned shaker and un-tuned percussion: Pauken, syndrom, Classic instruments: guitar, organ, Panasonic S-XBS Bi-Wiring System, and traditional instruments: Tombak, Daf, Santur.

Results

ANOVA and ANCOVA for the comparison between the composite scores on negative symptoms (SANS) and positive symptoms (SAPS) in experimental and control groups found that music therapy had significant effects on the composite score for SANS ($P < .05$) in comparison with the score

for positive symptoms, and on one important subscale of negative symptoms, namely, anhedonia-asociality ($P < .01$). The non-significant results in the subscales of SANS were found affective flattening, alogia, avolition-apathy and attention impairment and non-significant of the subscales of SAPS were hallucinations, positive formal thought disorder, and bizarre behaviour in comparison between the groups.

The mean of the total score of the SANS was 36.1 for the exp group 1, 38.0 for the exp group 2, and 45.4 for the control group. The ANCOVA showed a significant main effect for negative symptoms [(2, 92) 4.50, $p < .05$], and on the nine subscales, another main effect was found on one important subscale of negative symptoms, namely, anhedonia-asociality [(2, 92) 14.10, $p < .01$]. Post-hoc analyses of mean differences revealed significant differences between groups 1 & 3 and 2 & 3 on negative symptoms and between groups 1 & 2, 1 & 3, and 2 & 3 on anhedonia-asociality (Table 3).

Table 3: T-ratios obtained from comparison of mean differences of negative symptoms (SANS) after ANCOVA performed on total scale and subscales

Sample/Score	Variable	Groups	Mean (Adjusted)	Comparison	df	t-ratio	t .05	T .01
Total (Composite Score) N= 96	Negative Symp-toms	Exp group 1	36.1	1 vs. 2	92	.56	1.645	2.33
		Exp group 2	38.0	1 vs. 3		2.925**		
		Cont group 3	45.4	2 vs. 3		2.16*		
Total (Subscale Score) N= 96	Anhe-donia/ asociality	Exp group 1	8.3	1 vs. 2	92	1.86*	1.645	2.33
		Exp group 2	9.8	1 vs. 3		5.31**		
		Cont group 3	12.3	2 vs. 3		3.09**		

* P <.05; ** P <.01

t, tabled t values

cont, control group

In male participants a significant main effect on negative symptoms [(2, 56) 3.75, p < .05] and one subscale of negative symptoms, namely, anhedonia-asociality was found [(2, 56) 9.84, p < .01]. In the female sample, a main effect on positive symptoms [(2, 32) 3.65, p < .05] and two subscales of negative and positive symptoms, namely, anhedonia-asociality [(2, 32) 4.46, p < .05] and delusion [(2, 32) 4.04, p < .05] were found. Table 4 shows post-hoc analyses of mean differences between groups based on subscales based on gender.

Post-hoc analyses of mean differences on positive symptoms of residual type revealed significant differences between groups 1 & 2 and 2 & 3, on negative symptoms of residual type between groups 1 & 2 and 1 & 3, and on affective flattening of this type between groups 1 & 2 and 1 & 3 (Table 5).

Discussion

Results overall indicate that both active and passive music therapies have significant effects on the composite scores for

negative symptoms. Results also revealed the effect of music therapy on one very important subscale of negative symptoms, namely, anhedonia-asociality. The findings of Hayashi et al. (2002) also showed significant effects of music therapy on emotional withdrawal, poor rapport, and passive-apathetic syndromes. It can be assumed that music re-connects these participants with their environment due to an innate, primitive affinity that all human beings possess towards music, which transcends verbal communication (Tyson, 1984).

It is reasonable to assume that listening to familiar songs and playing instruments facilitate nonverbal expression and communication. Our results are consistent with the findings by Talwar et al. (2006), who concluded that music therapy is not an effective treatment for reducing the positive symptoms of schizophrenia. Positive symptoms are typically pervasive and long-lasting and only responsive to high doses of psychotropic medication. Positive symptoms represent presence of distortions in thought content which are more resistant to any change, but negative symptoms reflect a restricted range of emotional expressiveness such as affective flattening, loss of pleasure or interest, and social withdrawal or isolation through music they have better motivation.

Also, separate analyses of covariance indicate that the effects of music therapy are relatively stronger, more pervasive and

Table 4: T-ratios obtained from comparison of mean differences of negative and positive symptoms (SANS and SAPS) after ANCOVA performed on subscales based on gender

Sample/Score	Variable	Groups	Mean (Adjusted)	Comparison	df	t-ratio	t .05	t .01
Male (Composite score) N = 60	Negative symptoms	Exp group 1	33.8	1 vs. 2	56	.37	1.645	2.33
		Exp group 2	35.5	1 vs. 3		2.62**		
		Cont group3	44.2	2 vs. 3		1.96*		
Male (Subscale score) N = 60	Anhe-donia- asociality	Exp group 1	8.0	1 vs. 2	56	1.1	1.645	2.33
		Exp group 2	9.1	1 vs. 3		4.345**		
		Cont group3	12.0	2 vs. 3		2.78**		
Female (Composite score) N = 36	Positive symptoms	Exp group 1	39.7	1 vs. 2	32	.55	1.645	2.33
		Exp group 2	33.1	1 vs. 3		2.925**		
		Cont group3	53.0	2 vs. 3		2.16*		
Female (Subscale score) N = 36	Anhe-donia- asociality	Exp group 1	9.0	1 vs. 2	32	1.38	1.645	2.33
		Exp group 2	10.7	1 vs. 3		3.01**		
		Cont group3	12.7	2 vs. 3		1.67*		
Female (Subscale score) N = 36	Delusion	Exp group 1	17.3	1 vs. 2	32	.94	1.70	2.33
		Exp group 2	13.9	1 vs. 3		1.80*		
		Cont group3	23.9	2 vs. 3		2.67**		

* P < .05; ** P < .01

t, tabled t values

Table 5: T-ratios obtained from comparison of mean differences of negative and positive symptoms (SANS and SAPS) after ANCOVA performed on total scale and subscales based on type of schizophrenia

Sample/Score	Variable	Groups	Mean (Adjusted)	Comparison	df	t-ratio	t .05	T .01
Residual (Composite Score) N = 20	Positive Symptoms	Exp group 1	31.5	1 vs. 2	16	2.66 **	1.75	2.58
		Exp group 2	20.4	1 vs.3		.61		
		Cont group 3	28.9	2 vs. 3		2.16*		
Residual (Composite Score) N = 20	Negative Symptoms	Exp group 1	42.0	1 vs. 2	16	2.28*	1.75	2.58
		Exp group 2	32.0	1 vs. 3		2.81**		
		Cont group 3	29.6	2 vs. 3		.56		
Residual (Subscale Score) N = 20	Affective flattening	Exp group 1	11.9	1 vs. 2	16	2.94**	1.75	2.58
		Exp group 2	7.8	1 vs. 3		2.65**		
		Cont group 3	8.2	2 vs. 3		.31		

* P < .05; ** P < .01

t, tabled t values

more encompassing for female participants as compared to male participants. Women registered a significant impact of active and passive music therapies on anhedonia-asociality and delusion. Passive music therapy was found more effective than active music therapy. One explanation for the stronger effect of music on female participants may be sought in terms of cultural assumptions in Iranian society that response to emotionally-tinged musical stimuli probably penetrates deeper into the female psyche as compared to the male participants. According to this theory, women could benefit from music in an emotional way, as they spend more time at home due to their traditional roles in our country and spend more time listening to music. Music can be one of the most soothing experiences that is always available for them, and listening to music may alleviate stress and ward off tensions when they are working at home.

Looking at the different types of schizophrenia, paranoid participants seem to have a higher degree of tension toward some activities in which they have the feeling that their thoughts or secrets may be revealed, perhaps due to their suspiciousness. Therefore, they may have rejected some of the music activities, in which they are forced to communicate with others. The clinical picture of the paranoid type is dominated by positive symptoms such as delusions and hallucinations, while negative symptoms are relatively absent. This could account for the lack of significant effects on the paranoid type.

In the case of the residual type of schizophrenia, some significant results were obtained regarding the effect of active and positive symptoms that are primarily characterized by major types of negative symptoms which signify lack of emotions, and a total lack of interest in social participation. Positive symptoms are either very few or very mild and include odd beliefs, eccentric behaviours, etc. The effect of passive music therapy on negative symptoms was also relatively better as judged from the comparison of means of the experimental and control groups on the composite scores of negative symptoms and the affective flattening subscale of negative symptoms, even though results do not attain the level of significance.

Finally, one interesting result is a positive impact of passive music therapy on the patients. Since the residual type is usually lacking major positive symptoms such as hallucina-

tions and delusions, the patients' ability for trusting communication was strengthened. Patients listening to the music could establish a trusting relationship and express their emotions and interactions with the therapist and others. Considering their extreme affective flattening meetings, they were reluctant to do any active music such as instrumental ensembles and moving, but they had a preference for passive music.

Limitations

There are some primary limitations inherent this study that should be considered when interpreting the findings. The first limitation is the small sample size. Especially when looking at subgroups, such as different schizophrenia types and gender, the quality of meaningful comparisons may be reduced. That means that other group differences in subscales of negative symptoms were probably not detected due to the low statistical power of the study: Perhaps a replication of the study with a bigger sample and more rigorous controls will help further verify the results.

The second limitation was the duration of music therapy was only one month. In future studies, the time of music therapy that is given to the experimental groups should be increased to at least two or three months. Furthermore, the control group should also be exposed to some social settings without musical interventions. Finally, a follow-up of participants is very important to know whether the effects of music therapy are permanent or short-lived.

Recommendations for Future Research

A question raised by this study relates to how music affects change within a seriously mentally ill population. The effects of music therapy may involve more process-level outcomes that would assess the extent to which music therapy enhances emotional and cognitive awareness. Additionally, it is necessary for any study to consider the cultures of the participants as well as the types of schizophrenia in order to estab-

lish a model for the impact of music therapy within this population.

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