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Zahra Nazarian[*]
Bahram Armoon[**]
Omid Rezaei[***]
Seyedshahab banihashem[****]
Mostafa Hamideh[*****]

The Effect of Pet Therapy Concurrent with Common Medication on Positive, Negative, Cognitive and Motor Symptoms of Schizophrenia: A randomized control trial

Abstract: ***Background***: *Pet therapy could help individuals improve their emotions; and physical and mental health. It also could be effective in the treatment of pain, anxiety, depression, and fatigue. The aim of this study was to determine the effectiveness of pet therapy, concurrent with common medication on positive, negative, cognitive and motor symptoms of schizophrenia.*

Methods: *This was a randomized control trial. Statistical population of the current study included all patients who were admitted to the Razi Psychiatric Center of Tehran and received a diagnosis of schizophrenia based on a clinical interview and DSM criteria by a psychiatrist. Thirty six patients were recruited using snowball sampling. Members of the experimental group were transported by a bus to that spot at 9 a.m on the planned days, in the company of the researcher and a nurse. Patients gave care of the rabbits (including feeding, tidying their cages, moving their cages) for 24 sessions of 90 minutes, three days per week during autumn 2016. The One-way covariance test was also used to evaluate effects of Pet therapy on positive, negative, cognitive and motor symptoms of schizophrenia.*

Results: *finding indicated that considering scores of pre-test for positive, negative and cognitive symptoms, there is a significant difference between the two controls and experimental groups, respectively, ($F = 17.04$, $p < 0.05$), ($F = 17.39$, $p < 0.05$), ($F = 152.12$, $p < 0.05$).*

Conclusion: *Pet therapy could be successfully applied by parents, psychologists and care givers of these patients. We suggest using pet therapy for treatment of other psychiatric disorders as well and preferably like dogs and cats.*

Keywords: *Pet Therapy, Positive Symptoms of Schizophrenia, Negative Symptoms of Schizophrenia, Cognitive Symptoms of Schizophrenia, Motor Symptoms of Schizophrenia*

Introduction

Schizophrenia is a severe debilitating disorder that affects physical and mental health, function, independence, and well-being of those who suffer from it[1]. Schizophrenia could lead to cognitive, motor, perceptual and emotional deficiencies[2]. Cognitive deficits are common among patients with schizophrenia and are strongly associated with occupational and functional despair. World Health Organization (WHO) surveys indicate that almost

[*] **Department of Clinical Psychology, Islamic Azad University, Karaj, Iran**
[**] **Student Research Committee, School of Public Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran**
[***] **Associate Professor of Psychiatry, Psychosis Research Center & Psychiatry Department, University of Social Welfare Rehabilitation Sciences, Tehran, Iran; Department of Psychosomatic Medicine, Taleghani Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran**
[****] **Department of Psychosomatic Medicine, Taleghani Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran**
[*****] **Associated professor of Neuro psychiatry, Shahid Beheshti University of Medical Sciences, Faculty of Medicine, Taleghani hospital psychosomatic ward**

Corresponding author: Omid Rezaei, e-mail: om.rezaei@uswr.ac.ir

36 million people are suffering from schizophrenia worldwide, and that 2 million new cases of schizophrenia are reported each year globally[3].

Despite the real revolution of drug treatment for schizophrenia, which led to control the disorder and dramatic reduction of the number of in-patient cases since 1955, rate of reception for recurrent cases of patients with schizophrenia increased and more than 72% of patients experienced recurrent within 2–5 years after discharge from the hospital[4]. Treatment of schizophrenia is usually on life long-term and includes a combination of medicine and psycho-social interventions[5]. Antipsychotic drugs that mainly suppress dopamine (and sometimes serotonin) receptor activity, are known as the fulcrum of medical treatment. So many problems with this disorder remain, although drug treatment eliminates most of problematic symptoms such as hallucination, delusion[6]. Therefore other interventions are required to move beyond drug treatment limitations. On the other hand, most of these drugs have many side effects such as sedation, spasticity and extrapyramidal symptoms. Therefore, psychological and social interventions are essentially required for treatment of this disorder[7].

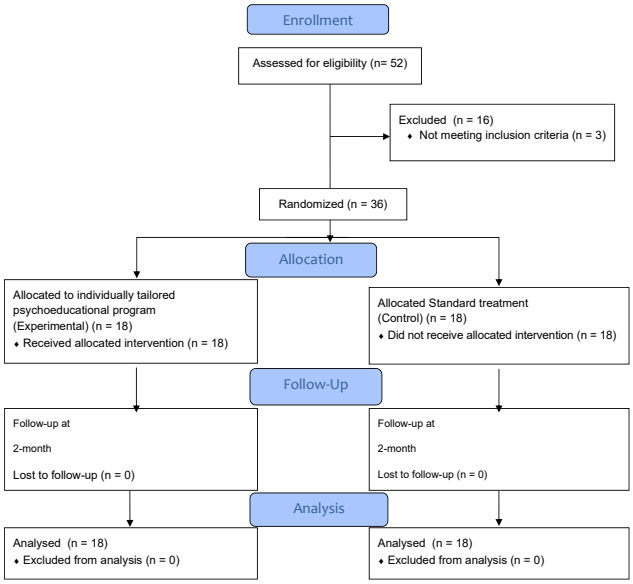
People with schizophrenia disorder could benefit from pet therapy, as a complement intervention. Some advantages of Pet therapy include: improved physical and mental health, improved concentration, reduced anxiety, depression and fatigue, increased communication skills[8, 9]. Pet therapy or animal assisted therapy is a directed interaction between people and pet, built by former relationship between human being and animals. Pet therapy can contribute to physical improvement and progress in social relations, emotions and foundations of human cognition[10, 11]. Pet therapy could help individuals improve their emotions; and physical and mental health. It also could be effective in treatment of pain, anxiety, depression, and fatigue[10]. Some people, like many individuals with Schizophrenia disorder are lonely and suffer from lack of physical contact and lots of problems are consequence with this matter, but feeding or touching the skin of a pet could efficiently fulfill this need of them[12]. Various types of animals were used in pet therapy among patients with depression, Alzheimer's disease, children with autism and such interventions led to positive results on concentration, and personal motivation, increased chances of psychical contact and improved mental status of individuals.

In spite of rapid development and expanded contribution of pet therapy worldwide, limit researches have been done in this field in Iran. Considering this limitation and novelty of pet therapy in Iran, current study was conducted to evaluate the effects and applicability of this treatment on improving cognitive and motor functions and negative and positive symptoms of patients with schizophrenia. This research will illustrate the role of pet therapy in the reduction of the mentioned symptoms of schizophrenia and improvement of its consequences.

Methods

This was a randomized control trial. Statistical population of the current study included all patients who were admitted to the Razi Psychiatric Center of Tehran and received a diagnosis of schizophrenia based on a clinical interview and DSM criteria by a psychiatrist (n = 52). Thirty six patients were recruited using snowball sampling. As a result, all patients in the Razi Psychiatric Center who met our research inclusion criteria were enrolled in the study population. 16 patients did not fulfill the inclusion criteria, so the intervention group consisted of 36 individuals from the sixth eastern Pardis ward of Razi hospital and then got placed randomly into two groups (18 patients were placed into the experimental group and 18 were placed in the control group). After specifying the experimental and control groups; positive, negative, cognitive and motor symptoms of both groups were assessed by study tools and the results were compared accordingly. Next step was to demonstrate the animal care plan (rabbits) – without any changes in their medical intervention – on the experimental group and the control group received their medicine and went on with their routine daily activities without any changes. At the end of the intervention, both groups were assessed by the research tools and got compared once more in respect of the above mentioned symptoms. Figure 1 represents the CONSORT flow chart of the method in the research.

Figure 1. Consolidated Standards of Reporting Trials[1] trial flow chart



Inclusion Criteria:

Patients invited to the study if they fulfilled following criteria:

- Had a definite diagnosis of schizophrenia mentioned in the patient's file, in accordance with DSM-IV-TR criteria by a psychiatrist.
- Patient's scores of positive and negative symptoms were above the cutoff point of 35 and 24 respectively.
- Had ages between 25 and 60 years.

- At least one year has passed since the onset of schizophrenia.
- We're able to participate in the research plan, that is, the ability to look after animals, including feeding, etc…
- Had any allergy or fear of animals, which is determined through asking patients directly and checking their records.
- Signed consent form collected from the samples, by desire.
- Resided in the hospital within the next three months from initiation of the research.
- Had permission to leave the ward.
- Were graduated up to the fifth grade at least.

Exclusion Criteria:

Attendances were excluded under the following conditions:

- Had brain Injury, dementia, the specific neurological disease requiring special care.
- Patients who were seriously affected by the side effects of antipsychotics, and receive exclusive treatment as a result, except for usual interventions.
- Patients who had experienced an acute episode of their disease.
- Patients influenced by drug use disorders. Smoking cigarettes was not a criterion of exclusion from the research plan.
- Had not received electroconvulsive therapy during 6 months prior to and during demonstration of the study. Patients who received electroconvulsive therapy during the study were excluded from the statistical population.
- Change of patient's medications during past two months.
- Had a history of seizure.
- An occurrence of a disease or any emergency conditions that prevent patient from continuing to participate in the study.
- A patient who discharged from the hospital due to any reasons.
- A patient who decided to discontinue participation in the study.

Instruments

Scale for Assessment of Positive symptoms (SAPS)

This scale was designed by Anderson and consists of 35 items. Each item is graded on a scale of 5 meaning a severe state to zero meaning no symptoms. The internal consistency of this scale was calculated 0.83, pre-test, post-test reliability was 0.88 and reliability of scoreboards was reported 0.87[13].

Scale for Assessment of Negative Symptoms (SANS)

This scale includes 24 phrases. Each item is graded on a scale of 5 meaning a severe state to zero meaning no symptoms. The higher the score is, the more frequent and more severe the negative symptoms are. Yasrebi (2007)[13], assesssed this scale among patients with schizophrenia and reported internal consistency of 0.94, pre-test post-test reliability of 0.92 and scoreboard reliability of 0.89.

Mini Mental State Examination (MMSE)

Mini Mental State Examination is an inventory tool to convert dementia from a qualitative attribution to a quantitative one. It contains 11 questions with the following sub-scales:

1 – Memory and Navigation (16 scores);
2 – Attention and concentration (5 scores);
3 – Assessment of language abilities and perception (8 scores);
4 – Spatial visual ability (1 score),

Total scores of questionnaire equal 30, scores of 25 and below suggest potential brain damage or mild dementia and scores below 20 indicate definite cognitive impairment or severe dementia. Cutoff point for males and females are 18 and 17 respectively[14].

In order to estimate validity and reliability of the questionnaire, 30 patients with dementia and 200 healthy subjects were asked to fill out the questionnaire, and Cronbach's Alfa coefficient of 0.81 was calculated using the test-retest method. A score of 22 was considered as the cutoff point, applying ROC normal distribution. Sensitivity of the test was 90% and specifity of it was 93.5.

Abnormal Involuntary Movement Scale (AIMS)

This scale consists of 12 parts, designed by the National Institute of Mental Health (NIMH), and applied for making observable motor impairments measurable. Each part of the test is scored from 0 to 4 based on the severity of the observed symptoms. It evaluates three main anatomic parts including lips and mouth in total. Referring to earlier studies, this test is highly valid and reliable and a trained person could administrate it within 10 to 15 minutes[15, 16].

Procedure

After obtaining necessary referral forms and letters and getting official permission for conducting our study from the hospital, by simple randomized method, samples were selected due to inclusion and exclusion criteria, and got evaluated through MMSE, AIMS, SANS and SAPS tests. Informed consent forms were collected from selected samples who were willing to join the study accordingly.

Intervention

The nature of the study, methods and purpose of the study was explained to both experimental and control groups. Necessary co-ordinations regarding look after animals for the experimental group was done. The researcher was initially trained by a vet regarding rabbits (general information, care giving, feeding, potential problems and solutions to those and best interaction ways with rabbits for the patients) and afterwards, veterinarian's confirmation in writing about the above mentioned points was issued to the hospital. Indeed, mature animals were used in the setting of the study and were examined individually by a veterinarian before enrolling to the study in respect of their health and hygiene (to make sure the rabbits are healthy and safe and that they won't bite or harm the patients), collected confirmation letter

from the vet about this matter was also issued to the hospital. The research procedure was conducted in some co-ordinated spot in the yard of the hospital. Members of the experimental group were transported by a bus to that spot at 9 a.m on the planned days, in the company of the researcher and a nurse. Patients gave care to the rabbits (including feeding, tidying their cages, moving their cages) for 24 sessions of 90 minutes, three days per week during autumn 2016. Patients in the experimental group found playing and caregiving rabbits very interesting and co-operated in the research plan enthusiastically and shared their learning with the researcher and staff of their ward accordingly. Researcher supervised all sessions carefully and all the sessions were held with same 10 rabbits, for gaining optimal interactions and connections between the patients and rabbits. The researcher also interviewed samples after each experimental session to understand their feelings, thoughts, suggestions, etc… regarding the research plan and witnessed high interest in the subject among the samples. All questionnaires were filled with the samples of the experimental and control groups again and results were compared with the pre-tests. Pre-test, post-test method was applied to determine the effect of interaction with animals during inpatient treatment.

Statistical analysis

In the current study, descriptive statistics Mean, and Standard Deviation methods were used, in order to analyze descriptive data. Also One-way Covariance was applied to analyze inferential statistics.

Results

In this study, 18 patients were considered. Demographic characteristics are presented in table 1. Samples comprised of 9 men (50%) and 9 women (50%). The mean age ± standard deviation (SD) was (50.1 ± 9.9). The majority (50%) of patients were Primary or below and had a history of hospitalization (10.2 ± 7.1). Fifty percent of participants were single and about half of them were suicide history.

Table 1. Demographic characteristics of patients

Characteristic	N	%
Age (Mean ± SD)	50.1 ± 9.9	
<45	7	38.9
>45	11	61.1
Sex		
Male	9	50.0
Female	9	50.0
Education		
Primary or below	9	50.0
High school	5	27.8
Diploma and high	4	22.2
Marital status		
Single	9	50.0
Maried	6	33.3
Divorced	3	16.7
Family history of schizophrenia		
Yes	6	33.3
No	12	66.7
Suicide history		
Yes	7	38.9
No	11	61.1
History of hospitalization	10.2 ± 7.1	

Table 2 shows Mean and Standard Deviation of experimental group and the control group before and after the intervention.

According to table 2, there was a difference between Mean scores of the two groups in pre-test and post-test.

Table 2. Mean and Standard Deviation of Experimental Group and Control Group Before and After the Intervention

Variable	Group	Pre-Test		Post-Test	
		Mean	SD	Mean	SD
Positive Symptoms	Control	51.94	4.77	52	4.71
	Experimental	50.33	4.92	48.44	4.59
Negative Symptoms	Control	38.61	2.74	39.00	2.72
	Experimental	38.55	3.03	36.94	3.45
Cognitive Symptoms	Control	16.94	1.39	16.77	1.59
	Experimental	16.61	1.41	19.50	2.09
Motor Symptoms	Control	33.77	2.71	33.94	2.83
	Experimental	34.44	3.05	34.27	3.33

In order to test this difference in terms of statistical significance, On-way covariance test was applied. The one-way covariance test was also used to evaluate effect of Pet therapy on positive symptoms of schizophrenia (table 3).

Results indicated that considering scores of pre-test for positive symptoms, there is a significant difference between the two controls and experimental groups ($F = 17.04$, $p < 0.05$). In other words, the difference between the scores of groups reflected positive effect of Pet therapy on positive symptoms of schizophrenia and the effect rate equals 0.50. One-way covariance analysis was used to investigate the effect of Pet therapy on negative symptoms as well (table 4).

Results indicated that considering scores of pre-test for negative symptoms, there is a significant difference between the two controls and experimental groups ($F = 17.39$, $p < 0.05$). In other words, the difference between the scores of groups reflected positive effect of Pet therapy on negative symptoms of schizophrenia and the effect rate equals 0.51. One-way covariance analysis was used to investigate the effect of Pet therapy on cognitive symptoms (table 5).

Results indicated that considering scores of pre-test for cognitive symptoms, there is a significant difference between the two controls and experimental groups ($F = 152.12$, $p < 0.05$). In other words, the difference between the scores of groups reflected positive effect of Pet therapy on cognitive symptoms of schizophrenia and the effect rate equals 0.58. One-way covariance analysis was used to investigate the effect of Pet therapy on motor symptoms (table 6).

Results indicated that considering scores of pre-test for motor symptoms, there is a no significant difference between the two controls and experimental groups ($F = 0.33$, $p < 0.05$). In other words, the difference between

Table 3. One-way Covariance Test Results for Positive Symptoms of the Control and Experimental Groups

Source	Type III sums of squares	df	Mean Squares	F	P.value	Partial Eta Squared
Pre-test	700.92	1	700.92	651.27	0.001	0.95
Group	36.69	2	18.34	17.04	0.001	0.50
Error	35.51	33	1.07			
Total	91652	36				

Table 4. One-way Covariance Test Results for Negative Symptoms of the Control and Experimental Groups

Source	Type III sums of squares	df	Mean Squares	F	P.value	Partial Eta Squared
Pre-test	294.47	1	294.47	281.88	0.001	0.89
Group	36.33	2	18.16	17.39	0.001	0.51
Error	34.47	33	1.04			
Total	52275	36				

Table 5. One-way Covariance Test Results for Cognitive Symptoms of the Control and Experimental Groups

Source	Type III sums of squares	df	Mean Squares	F	P.value	Partial Eta Squared
Pre-test	55.85	1	55.85	29.85	0.001	0.47
Group	87.41	2	43.70	23.35	0.001	0.58
Error	61.75	32	1.87			
Total	12029	36				

Table 6. One-way Covariance Test Results for Motor Symptoms of the Control and Experimental Groups

Source	Type III sums of squares	df	Mean Squares	F	P.value	Partial Eta Squared
Pre-test	271.68	1	271.68	163.38	0.001	0.83
Group	1.12	2	0.56	0.33	0.715	0.02
Error	54.87	33	1.66			
Total	42216	36				

the scores of groups reflected no effect of Pet therapy on motor symptoms of schizophrenia.

Discussion

The purpose of the current study was to investigate effects of pet therapy in addition to common medications on positive, negative, cognitive and motor symptoms of patients who suffer from schizophrenia. Our findings suggested that pet therapy improved the positive symptoms of schizophrenia. Our results were indirectly in line with previous studies[17–19]. In explaining the effectiveness of pet therapy on positive symptoms of schizophrenia, it could be said that animals could be used to map human responses to the efforts of therapists during psychotherapy[20, 21]. Quotes Florence Nightingale that "animals are best companies for patients who are hospitalized for a long time in special places, as a result of suffering from chronic disorders". Also, animal assisted therapy could reduce stress and anxiety and help the patient connect with an environment that seems confusing to him[19].

Animal assisted therapy is a directed treatment method, used as an adjunct therapy combined with other interventions and reflects concepts such as contact, affinity, and unconditional love[22]. This kind of treatment could fulfill emotional needs of the patients. Animals not only could help improve mental status, social skills and psychological welfare of individuals, but also could help reduce depression and provide reassurance and reduce worry, which in turn makes progress in social isolation, loneliness and despair matters[23]. Animals could also be effective in treatment and optimal function of patients with degenerative disabling diseases and mental disorders, including schizophrenia, depression, anxiety, and ADHD. For instance, animals could assist in reduction of indifference, improve quality of life and reinforce motivation among people with schizophrenia[24].

Our findings also showed that pet therapy could lead to improvements in negative symptoms of schizophrenia, which is consistent with other studies[20, 25]. Results of this study also showed that pet therapy could improve cognitive symptoms of schizophrenic patients. This finding is indirectly in line with previous researchs[25–28]. Cognitive impairments, as one of the main aspects of schizophrenia, are an important indicator of functional outcome and subsequently an important therapeutic goal. Standard Deviation of cognitive tests among patients with schizophrenia is one or two scores lower than healthy subjects. The severity of such impairments is highest in memory, attention, working memory, problem solving, processing rate and social recognition[3]. Animal assisted therapy is getting increasingly popular globally. An animal could conduct sense of companionship; love and affection in people as much as a human being, and therefore could be helpful in providing peace to the therapeutic interventions.

An animal is not just something to talk to, but something to talk about, as well. It is thus recognized as a facilitator of interpersonal relationships. In addition, sharing feelings with an animal fulfills needs of physical contact. Animals develop a feeling of security, attachment, attention, forgiveness and unconditional love in human being. Saylor et al.[29] suggested that most patients with depression, isolation and despair have been hurt by words. Animals do not talk; so patients could keep their company and relax. From a therapeutic point of view, this will lead to reduced stress, anxiety and negative feeling and help the patient connect with a confusing environment[29].

Our findings showed that Pet therapy had no effects on motor symptoms of schizophrenic patients. Various studies during past 30 years suggested that interacting with pets could be highly effective in improving health, mental status and recovery after experiencing an acute and painful disease. Although literature review in this regard is limited and only studies with small sample sizes are available, systematic reviews certainly confirm these benefits. Most important body of research evidence that indicate physiologic improvements in pet owners are subjected about blood pressure variables, triglyceride serum and blood cholesterol level[30, 31].

There are also numerous studies regarding applying animal assisted therapy in rehabilitation of patients with spinal cord injury[32]. In the present study, non effectiveness of pet therapy on motor symptoms of schizophrenia could be due to inconsistent contact with the animals because of lack of adequate space at the hospital. On the other hand, pet therapy course of our study was on a short term basis and in case the program included more sessions, pet therapy might have affect motor symptoms significantly. Physical benefits of owning a pet could be increased physical activities and reduced arousal of the nervous system, related to sympathy. The fact that being around animals, have physical contact with them and interact with them may lead to special improvements on human health has been proven repeatedly[33]. It is preferred to use animals that have the ability to hatch with humans in pet therapy, but we did not have permission to bring those types of animals in the hospital. We did not have the possibility to keep the rabbits somewhere close to the ward, so that patients have the possibility to contact with the rabbits any time other than the study demonstration hours. This is while most previous studies considered only one or two symptoms of schizophrenia. This research was done for the first time in Razi Hospital, which is the largest psychiatric hospital in Iran with different sections. The main limitation of this study was the paucity of intervention program was only implemented on the experimental group. Therefore, it was impossible to compare the effectiveness of the program with other intervention plans.

Conclusion

Schizophrenia is a severe and chronic clinical disorder that affects cognition, emotions, perception and behavioral aspects. Various methods have been applied in the treatment of schizophrenia, including Pet therapy as a novel and world spread intervention. Current study aimed to determine effectiveness of Pet therapy on positive, negative, cognitive and motor symptoms of schizophrenic patients and results indicated positive effects on Pet therapy. Hence, Pet therapy could be successfully applied by parents, psychologists and caregivers of these patients.

Suggestions for Future Research:

We suggest using Pet therapy for treatment of other psychiatric disorders as well and preferably use animals that have the ability to hatch with human, like dogs and cats. In the end, we suggest physiotherapists to hold Pet therapy sessions for patients who suffer from schizophrenia at all therapeutic centers.

Conflict of interests:

All authors have no conflicts of interest to be declared.

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institution and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent : was obtained for all participants.

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Authors contributions:

Study design: OR and ZN. data synthesis: BA. Drafting the manuscript: BA and OR. Critical revision of the manuscript: SB and MH.

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