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ABSTRACT Patients with a diagnosis of schizophrenia living in long-term care units show high levels of disability. The present study aimed to assess the effectiveness of including a trained therapy dog in an intervention program applied to institutionalized patients with chronic schizophrenia. A randomized, controlled study with blind assessment was conducted. Twenty-four persons with chronic schizophrenia were randomly selected from a register that included all inpatients at Saint John of God's psychiatric hospital in Spain. Patients who agreed to participate ($n = 21$) were randomly assigned to one of the two treatment groups: one group received an intervention assisted by a therapy dog (IG+D) (12 patients), while the other received the same intervention but without a therapy dog (IG) (9 patients). The assessment items included the Positive and Negative Symptoms Scale (PANSS), the Living Skills Profile (LSP), the Brief World Health Organization Quality of Life Assessment (WHOQOL-BREF), and the Satisfaction with Treatment Questionnaire (STQ). Mann Whitney U tests and Wilcoxon signed-rank tests were conducted. Patients in the IG+D group showed significant improvements in the LSP social contact score ($p = 0.041$), in the positive ($p = 0.005$) and negative symptom dimensions ($p = 0.005$) and total score of the PANSS ($p = 0.014$), and in quality of life related with social relationships ($p = 0.024$). Patients in the IG group showed significant positive changes in positive ($p = 0.027$) and general symptoms ($p = 0.046$) and total PANSS score ($p = 0.027$). No differences were found between the two groups before and after the application of the intervention. Introducing a dog into the psychosocial intervention for patients with schizophrenia produced some positive outcomes. However, the results of the study are not conclusive and must be interpreted cautiously.

In the last few decades, a progressive deinstitutionalization of psychiatric patients has occurred. This process has selected patients with mild disabilities for community health services, while those with severe disabilities have remained in psychiatric institutions (Ochoa et al. 2003). It has been described that institutionalized patients perceive their quality of life as worse than their community analogues; as well, their social network decreases and their daily life abilities worsen (Leff, Trieman and Gooch 1996).

Patients with a diagnosis of schizophrenia constitute the majority of individuals in long-term care facilities. This disorder may have a very heterogeneous clinical presentation and course, but frequently leads to a high degree of disability in several daily life activities (Meise and Fleischhacker 1996). Several intervention programs have been designed and applied to patients with schizophrenia in order to improve their social functioning and reduce their disability (Garety et al. 1994; Hodel and Brenner 1994; Kuipers et al. 1998; Penades 2002). However, patients with schizophrenia still show high degrees of social disability (Usall et al. 2002; Ochoa et al. 2003; Villalta-Gil et al. 2006). Training in social abilities and treatments that try to improve social functioning usually show diminished success, given the limited social access and support of inpatients. This social support must be regular and must be provided by the rehabilitation services, among others. These services must readjust constantly their intervention in an appropriate manner in order to promote the provision of social support (Sheperd 1996).

For some time now, some therapists have introduced animals into their therapy sessions. Even though the presence of animals in institutionalized settings has a long history (Serpell 2003; Macauley 2006), the active participation of the animal in the therapy sessions is quite new. It was Levinson (1962) who first described that the presence of his dog eased the interaction with many children who were withdrawn and uncommunicative. Since then, some experiments with people with several disorders have been conducted, most of them reporting positive results in different areas, but particularly in social functioning (Mader, Hart and Bergin 1989; Barak et al. 2001; Banks and Banks 2002; Kovacs et al. 2004). However, the results mainly come from clinical observations; very little empirical research has been conducted on the effectiveness of animal-assisted therapy. Following a literature review (Villalta-Gil and Ochoa 2007), we found a few studies conducted on people with schizophrenia undergoing animal-assisted therapies. They have shown that interventions assisted by an animal result in improvements in social and daily life skills (Barak et al. 2001; Kovacs et al. 2004), negative symptoms (Mayol-Pou 2002), quality of life (Nathans-Barel et al. 2005) and mood symptoms (Barker and Dawson 1998). Unfortunately, most of these studies were not controlled and had small sample sizes. No previous studies have randomized either the selection or allocation of patients, nor have they used blind assessment.

The present study aimed to assess the effectiveness of including a trained therapy dog in an intervention program applied to institutionalized patients with a diagnosis of chronic schizophrenia. Specifically, we hypothesized that patients receiving the intervention assisted by a dog will improve their social competence, quality of life, and negative symptoms more than those patients receiving the same intervention program without the assistance of a therapy dog.

Methods

Design, Patients Selection and Allocation

A randomized, controlled study with blind assessment of outcome was used. The patients included in the study were inpatients at Saint John of God-Mental Health Services Hospital and came from different socio-demographic environments from the city of Barcelona and its surroundings. Only those patients staying at Long Term Care facilities were included; these patients cannot live in the community, due to their social and clinical characteristics. A long course of the disorder and cognitive or social deficits characterize patients staying in these facilities.

Inclusion criteria were: a) primary diagnosis of schizophrenia (DSM-IV criteria; APA 1994) with more than 10 years since onset; b) age over 18 years; and c) be institutionalized during the application of the program. Patients with mental retardation, neurological disorders, or having adverse psychological or physical reactions to animals were excluded. All patients were stable on medications. In accordance with these criteria, 24 patients with chronic schizophrenia were randomly selected from a computerized register that included all inpatients at Saint John of God's Hospital.

Selected individuals were informed by their psychiatrist of the objectives and methodology of the study, and they provided informed consent to participate. Patients did not receive any incentive to participate in the study. Three decided not to take part. The study was previously approved by the Saint John of God-Mental Health Services Ethics Committee, which follows the Helsinki Declaration of ethical standards.

Once a patient accepted inclusion in the study, the baseline assessment was administered. Afterwards, patients were randomly assigned to one of two novel treatment groups: one group received an intervention assisted by a therapy dog (IG+D; 12 patients assigned), while the other received the same intervention, but without the therapy dog (IG; 9 patients assigned).

The IG+D group was divided into three groups of four people each, of which 11 completed the full program. The IG group was divided into two groups of four and five people, respectively, of which seven completed the full program.

Interventions

The intervention program was applied by a trained psychologist. It consisted of 25 sessions of 45 minutes each; two sessions were given per week. The intervention group with therapy dog (IG+D) was directed by the psychologist, who was assisted by a two-year-old, female Labrador, certified as a therapy dog. The dog was accompanied by her handler. The group without a dog (IG) was directed by the same psychologist. The intervention was based on Integrated Psychological Treatment (IPT) designed by Brenner et al. (1994). This treatment for patients with schizophrenia has been developed to work as much on cognitive functioning as on social functioning. It is a group-intervention structured program with five subprograms: cognitive differentiation, social perception, verbal communication, social skills training, and interpersonal problem solving. They are hierarchically ordered, so the first interventions are directed to basic cognitive skills, the next interventions transform the cognitive skills into social and verbal behaviors, and the last ones train the patients in the solution of more complex interpersonal problems. In our study, it was partially modified, in order to bring dogs into the therapy sessions (Table 1).

Table 1. Description of the intervention program.

Subprogram*	Intervention Focus	Intervention Techniques	
		IG+D	IG
Cognitive Rehabilitation (6 sessions)	Attention Abilities	• Classifying objects brought by dog • Sustained attention: Stimulus being a particular dog action (e.g., wave tail)	• Classifying objects handled by therapist • Sustained attention: Stimulus being a particular therapist action (e.g., touch leg)
	Memory	• Short- and long-term recall of the dog's story • Sequences with dog	• Short- and long-term recall of a story • Sequences
Social Perception (3 sessions)	Social Stimulus Analysis	• Description and interpretation of a social interaction in which the dog participated • Discussion about the above social situation	• Description and interpretation of a social interaction • Discussion about the above social situation
Verbal Communication (4 sessions)	Conversation Abilities	• Repetition of verbal orders for the dog • Questions generation implying the dog • Conversation about a topic limited to the dog • Free conversation	• Repetition of verbal stimulus • Questions generation • Conversation about current news • Free conversation
Social Abilities (5 sessions)	Competence in Social Abilities	• Cognitive training in low and high emotional risk abilities always related to the dog (e.g., asking the bus driver to let the dog get in) • Role-play	• Cognitive training in low and high emotional risk abilities • Role-play
Interpersonal Problem Solving (5 sessions)	Practicing Problem Solving Strategies	• Identification and analysis of a problem (e.g., ask the dog to bring a ball which is inside a drawer) • Generating solutions • Generating alternative solutions • Practicing those solutions • Evaluate the exercise	• Identification and analysis of a problem • Generating solutions • Generating alternative solutions • Practicing those solutions • Evaluate the exercise

* Two more sessions were conducted: one to introduce the program to the patients and one to end the program.

IG = intervention group (no therapy dog); IG+D = intervention group with therapy dog

Sessions for the IG+D group were designed so that the handler interacted with the dog and the therapist, the therapist interacted with the patient and the handler, and patients interacted with the dog and the therapist. This design was used in order to minimize interactions between handler and patients, as the handler was not present in the IG group. Sessions were also designed so that materials used in the IPT (cards, sentences, etc…)

were substituted by, or were referenced to, the dog (sample exercises are described in Table 2). The dog had an active role within the sessions, so certification of the dog as a therapy dog was mandatory.

Table 2. Two sample exercises from the program, describing the role of each participant for each group.

Aim	Exercise	Therapist	Dog	Handler	Group
Accommodate the tone of voice according the message given	Repetition of commands for the dog *(i.e., Cuca, bring the ball; Cuca, touch the cone, etc…)*	The therapist indicated the command/-sentence to be said. Correct patients until said correctly	Execution of the command when allowed by handler	Agree with therapist the commands that can be used. Inhibited the behavior of the dog until the verbal command had been given appropriately (according to therapist criteria)	IG+D
	Repetition of sentences *(i.e., Pass me the jacket)*		—	—	IG
Attention functions	Classify several items regarding some characteristics *(i.e., Please, give me five yellow, animal-related object-cards)*	Specify characteristics to be searched. Help patients to focus attention on those characteristics	Hold the object-cards and carry the selected object-cards to the therapist	Supervise that the dog does not drop the object-cards given by patients all the way until the dog reaches the therapist	IG+D
		Checks whether objects selected have the characteristics specified	—	—	IG

IG = intervention group (no therapy dog); IG+D = intervention group with therapy dog

Saint John of God Hospital does not have resident pets. Thus, interactions with dogs were limited to exposures during sessions. Exposures during "leave" (when patients could leave the institution for a few hours) could not be controlled; we assume equal chance for patients of both groups to be exposed to dogs during these periods.

Patients received their usual pharmacological treatment during the course of the study.

Assessment Procedures and Instruments

All patients were evaluated by a trained psychologist blind to the patient's intervention group at baseline and after the intervention program (patients were asked not to mention details about the therapy sessions and the psychologist was also not supposed to gather information

about their intervention group). Socio-demographic and clinical variables were gathered. Symptoms were assessed with the Positive and Negative Syndrome Scale (PANSS) (Kay, Fiszbein and Opler 1987), Spanish version (Peralta and Cuesta 1994); higher scores indicate more severity of symptoms. Social competence was assessed with the Living Skills Profile (LSP) (Rosen, Hadzi-Pavlovic and Parker 1989); this scale gives information of five areas of functioning: self-care, personal social behavior, social contact, non personal social behavior, and autonomous life. Subjective perception of quality of life was assessed with the Brief World Health Organization Quality of Life Assessment-Spanish version (WHOQOL-BREF) (Lucas 1998), which gives us information on perception of quality of life in four domains: physical health, psychological, social relationships, and environment. Higher scores in either the LSP and the WHOQOL-BREF indicate better social competence. The post-intervention assessment also included the Satisfaction with Treatment Questionnaire (STQ) (Larsen et al. 1979); higher scores indicate more satisfaction. Only the WHOQOL-BREF and the STQ were self-administered. A schedule assessing adverse reactions to animals, the Wechsler Adult Intelligence Scale (Wechsler 1999), and the Mini Mental State Examination (Folstein, Folstein and McHugh 1975; Lobo and Ezquerra 1979) were used as screening instruments, in order to confirm inclusion of patients into the sample.

Data Analysis

Due to the sample size, non parametric statistical tests were performed. In order to assess differences between groups, Mann Whitney *U* tests were conducted. In order to assess differences before and after the application of the program in both groups, Wilcoxon signed-rank tests were used. Cohen's *d* for effect size was also computed.

All statistical analyses were conducted using SPSS for Windows 10.0 (Chicago, IL, USA).

Table 3. Sample characteristics for each intervention group.

	IG+D	IG
Mean Age (*SD*)	49.08 (9.37)	48.88 (8.62)
Mean Years Since Onset (*SD*)	28.55 (9.43)	29.03 (9.06)
Male Gender (%)	91.7	77.8
Years of Education (%)		
1–4	25.0	11.1
5–8	33.3	33.3
9–12	25.0	55.6
>12	16.7	0.0
Marital Status (%)		
Single	100.0	77.8
Married	0.0	22.2
Schizophrenia Subtype (%)		
Paranoid	58.3	44.4
Catatonic	0.0	0.0
Disorganized	8.3	22.2
Undifferentiated	8.3	0.0
Residual	25.0	33.3

IG = intervention group (no therapy dog); IG+D = intervention group with therapy dog

Table 4. Mean scores (Wilcoxon signed-rank test) before and after the intervention in both groups and value of Cohen's d for those variables showing significant differences.

		IG+D				IG			
		IG+D Basal Mean(SD)	Post-Intervention Mean(SD)	Z	d	IG Basal Mean(SD)	Post-Intervention Mean(SD)	Z	d
LSP	Self-Care	32.00 (5.29)	31.81 (6.03)	-0.12		32.67 (4.33)	31.57 (5.77)	-0.17	
	Social Behavior	33.33 (4.54)	32.73 (3.85)	-0.12		32.89 (3.48)	34.57 (2.37)	-1.47	
	Social Contact	13.67 (2.67)	18.00 (4.40)	-2.04*	-1.19	14.56 (2.88)	18.57 (4.65)	-1.57	
	Non Social Behavior	22.50 (1.38)	20.55 (2.94)	-1.97*	0.85	23.11 (0.93)	21.71 (1.80)	-1.22	
	Autonomous Life	14.50 (4.42)	15.64 (5.26)	-1.49		13.56 (2.65)	15.29 (4.54)	-0.85	
PANSS	Positive symptoms	20.83 (5.46)	15.64 (4.03)	-2.81**	1.08	22.67 (7.71)	17.00 (6.07)	-2.21*	0.82
	Negative Symptoms	28.92 (5.25)	19.36 (6.34)	-2.81**	1.64	25.44 (4.42)	16.67 (4.32)	-1.89	
	General Symptoms	38.50 (3.66)	34.91 (6.80)	-1.74		38.11 (5.82)	28.50 (5.58)	-1.99*	1.69
	Total PANSS	88.25 (12.17)	73.64 (18.69)	-2.45*	0.93	86.22 (10.03)	61.83 (12.69)	-2.21*	2.13
WHOQOL-BREF	Physical Health	3.11 (0.56)	3.40 (0.46)	-0.96		3.27 (0.84)	3.21 (0.46)	-0.13	
	Psychological	2.97 (0.67)	3.12 (0.65)	-0.45		3.37 (0.54)	3.53 (0.60)	-0.27	
	Social Relationships	2.08 (0.79)	2.85 (0.56)	-2.26*	-1.12	2.81 (1.02)	3.22 (0.69)	-0.27	
	Environment	3.01 (0.82)	3.11 (0.51)	-0.85		3.10 (0.67)	2.85 (0.71)	-1.84	
STQ		—	24.36 (3.47)	—		—	25.17 (4.87)	—	

LSP = Living Skills Profile; PANNS = Positive and Negative Syndrome Scale;
WHOQOL–BREF = Brief World Health Organization Quality of Life Assessment – Spanish version; STQ = Satisfaction with Treatment Qu0stionnaire

IG = intervention group (no therapy dog); IG+D = intervention group with therapy dog

$* p < 0.05$ $** p < 0.01$

Results

Table 3 shows the socio-demographic and clinical characteristics of the patients included in each of the two groups. Patients' mean age was almost 50 years and the mean time since the onset of the illness was nearly 30 years. Most patients were men who had never been married. None of them were illiterate. Most patients had a diagnosis of chronic paranoid schizophrenia. No significant differences were found in these variables between the two groups.

Patients in the IG+D group showed significant improvements in the area of social contact (assessed with the LSP; higher scores mean better functioning: $p = 0.041$), in positive ($p = 0.005$) and negative symtoms ($p = 0.005$) and total score of the PANSS ($p = 0.014$), and they also perceived their quality of life related to social relationships significantly better ($p = 0.024$). On the other hand, their non-personal social behavior, assessed with the LSP, significantly worsened ($p = 0.049$) (Table 4). Regarding the patients in the IG group, we only found significant positive differences in positive ($p = 0.027$) and general symptoms ($p = 0.046$) and total score of the PANSS ($p = 0.027$) (Table 4). The effect sizes for all the significant results were over 0.80, indicating that the mean scores of those variables were over the 79 percentile of the basal measure.

No differences were found between the two groups of patients (Mann Whitney U tests) in any of the variables assessed at baseline or after the application of the intervention.

Discussion

Our results partially support the use of animals in the therapy of patients with schizophrenia. However, the study has important limitations. First, the sample size is small, which decreases the ability to detect differences between groups. Second, 14.3% of the patients dropped out of the treatment before the end of the sessions. Third, the characteristics of the intervention prevented double-blind design to be implemented. Fourth, the handler was not present in the intervention group which didn't have the dog. Finally, a large number of statistical comparisons were performed, which increases the possibility of finding spurious results.

The two groups of inpatients included in the study improved with the intervention based on the Integrated Psychological Treatment designed by Brenner et al. (1994). Both groups showed significant improvements in positive symptoms, as well as in the total PANSS score. Although there were no statistical differences between the group which received therapy assisted by a dog and the group which received the treatment without the assistance of a therapy dog, before and after comparisons within each group indicated some extra benefits for the group assisted by the dog.

While the patients who didn't have the therapy dog also improved their general symptoms, patients in the therapy-dog group also improved in the areas related to social contact. It is noticeable that patients improved in severity of negative symptoms which, as assessed by PANSS, include the evaluation of social functioning (Addington and Addington 1999; Dickinson and Coursey 2002). Previous studies found similar results regarding improvements of negative symptoms (Mayol-Pou 2002). The improvement in negative symptoms is significant, as pharmacological treatments have been described to be more effective for positive symptoms (Feldman et al. 2003; Miller 2004; Rueter et al. 2004), and negative symptoms have also been defined to be more predictive of disability than other clinical variables (Dickerson et al. 1999; Villalta-Gil et al. 2006). Thus, psychosocial interventions successful in reducing severity of negative symptoms should be taken into account.

The other area in which patients with the therapy dog improved refers to objective and subjective assessment of social contact. Thus, patients perceived a significantly better quality of life related to social relationships; as well, objective social contact abilities improved. Pets not only interact directly with people but, through their presence alone, may also modify the social behavior between two or more people (Messent 1985). This is what could have happened with the patients in this group: they benefited not only from the intervention and the direct contact with the dog but also from focusing the attention of other people in the institution. The same reaction has been found in people with other disabilities; for instance, Mader, Hart and Bergin (1989) found that children with physical disabilities who had a service dog had more positive social contacts with non-disabled people than children with disabilities who didn't have a service dog. These results led them to conclude that service dogs facilitate social acknowledgement for children with disabilities. We should acknowledge that the handler in our study was not present in the IG group, thus the effect of the handler on the social variables is unknown. However, this effect was minimized by using a design where the interaction between handler and patients within the sessions was reduced.

We found that non-personal social behavior significantly worsened in the patients who were assisted by the therapy dog. A similar trend was seen in the patients who didn't have the therapy dog. This behavior refers mainly to disruptive behaviors directed towards public objects, spaces, or themselves. The intervention program did not focus on these behaviors, so therefore future interventions should take non-personal social behaviors into account.

Besides the problem of having a small sample size, the small number of differences we found in our study could be due to the sample characteristics. Patients had over 28 years since the onset of illness, coupled with a chronic disorder diagnosis and high levels of disability. Therefore even though there were significant within group differences, improvements in the areas assessed were not big enough to give statistical significance between the groups.

People with a diagnosis of chronic schizophrenia living in institutionalized settings have very low levels of social functioning and social activity (Kovacs et al. 2004). Negative symptoms have not been much reduced by antipsychotic medication and this group of symptoms is frequently associated with a chronic course of the disorder and with high levels of social disability (Hammer, Katsanis and Iacono 1995; Liddle 2000; Grawe and Levander 2001; Penades et al. 2001). Results from our study regarding improvement of negative symptoms and social functioning give support to previous studies (Barker and Dawson 1998; Barak et al. 2001; Mayol-Pou 2002; Kovacs et al. 2004; Nathans-Barel et al. 2005) and also suggest that introducing a dog into some intervention programs could be beneficial for inpatients with chronic schizophrenia.

Interventions aimed to improve social abilities and support can help people with chronic disorders to improve their community functioning (Farkas 1996). Outpatients with schizophrenia show social withdrawal and this withdrawal increases if patients are institutionalized. Introducing dogs into some psychosocial interventions may facilitate the patients' social abilities, thus improving their ability to function in the community.

Acknowledgements

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