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Non conventional psychiatric rehabilitation in schizophrenia using therapeutic riding: the FISE multicentre Pindar project

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Summary. The FISE *(Federazione Italiana Sport Equestri)* Pindar is a multicentre research project aimed at testing the potential effects of therapeutic riding on schizophrenic patients. Twenty-four subjects with a diagnosis of schizophrenia were enrolled for a 1 year-treatment involving therapeutic riding sessions. All subjects were tested at the beginning and at the end of treatment with a series of validated test batteries (BPRS and 8 items-PANSS). The results discussed in this paper point out an improvement in negative symptoms, a constant disease remission in both early onset and chronic disease subjects, as well as a reduced rate of hospitalization.

Key words: therapeutic riding, schizophrenia, metacognition, horse, psychiatric rehabilitation, animal-assisted therapies.

Riassunto *(Riabilitazione psichiatrica non convenzionale nella schizofrenia tramite la riabilitazione equestre: il progetto multicentrico Pindaro FISE)*. Il progetto Pindaro FISE (Federazione Italiana Sport Equestri) è uno studio multicentrico sui possibili effetti positivi della riabilitazione equestre sugli esordi schizofrenici. Sono stati trattati per circa un anno con sedute di riabilitazione equestre 24 pazienti con diagnosi di schizofrenia tanto in fase di esordio che cronicizzata. I soggetti sono stati sottoposti ad una batteria di test validati (BPRS e PANSS a 8 items) all'inizio e alla fine delle sedute. Dai risultati preliminari, presentati in questo lavoro, si evidenzia un persistente stato di remissione della patologia per quanto riguarda i sintomi negativi, assieme ad una diminuzione dei giorni di ricovero.

Parole chiave: riabilitazione equestre, schizofrenia, metacognizione, cavallo, riabilitazione psichiatrica, terapie assistite con gli animali.

INTRODUCTION

Schizophrenia is a multifactorial disorder characterized by cognitive and affective symptoms such as distortions of thinking and perception and loss of normal affective expressiveness. Although the prevalence of schizophrenia ranges from four to seven per 1000 persons [1], this condition is one of the major contributors to the global burden of disease, due to its onset in early adulthood and its persisting or fluctuating symptoms [1, 2]. Characteristic symptoms of schizophrenia are delusions, hallucinations, disorganized speech (*e.g.* frequent derailment or incoherence), catatonic behavior, such as excitement, negativism, mutism and stupor, and negative symptoms, such as marked apathy, blunting or incongruity of emotional responses, usually resulting in social withdrawal and lowering of social performance. Schizophrenia is indeed devastating for people affected, who suffer a significant and consistent change in the overall quality of some aspects of personal behavior, manifested as loss of interest, aimlessness, idleness, self-absorbed attitude and social withdrawal. Therefore, for a significant portion of the time since the onset of the disturbance, one or more major areas of functioning such as work, interpersonal relations, or self-care are markedly below the level achieved prior to the onset [2, 3].

Patterns of relapse and remission vary between individuals but, with the current mix of interventions, we can only reduce 13% of the burden [1]. The chronic course and persisting symptoms of this disorder lead to a high impact of costs for families and society, which have to cope with lifetime needs for treatment and support. Therefore, there is a great need for interventions aimed at reducing family and health care burden while increasing social functioning.

Psychiatric rehabilitation practices have had a surge in Italy since the Italian Mental Health Act of 1978 or Basaglia Law (Law 180), a large reform of the psychiatric system in Italy, which resulted in the closing down of all psychiatric hospitals and their gradual replacement with a whole range of community-based services, including settings for acute inpatient care. Initially, psychiatric rehabilitation was specifically directed towards people from psychiatric

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hospitals characterized by a high degree of chronicity. However early interventions on those psychotic patients with a recent history of disease or as soon as a diagnosis has been reached might represent a much more effective strategy, representing a priority for Mental Health Departments.

The main goal of a proper psychiatric rehabilitation program should be to help a patient re-acquiring a full social role and to provide new tools for a self-sufficient life [4]. There are currently many potential choices (art therapies, music, dance, sport, pottery, etc), and even if most of them give interesting results, too often the patient remains in a border area. The most important themes of psychiatric rehabilitation are: i) to attend the psychoses at their early state; ii) the capability to intercept the users; iii) the non-separation between therapy and rehabilitation; iv) the conjugation between the non medical context and the scientific quality of the interventions; v) precocity of interventions; vi) the ability to build personalized tracks functional to the specific gaps of each patient. The psychiatric rehabilitation fundamental aim is to re-build a relational and psychic unit violently broken by the disease, to offer the patients not only remission of symptoms but also a support to them considered as "human beings" so to make easier their reinstatement in the "normal" community where they have been excluded from. To "recover" or to "improve" are phases of separation from the disease and its reassuring presence. To enter the rehabilitative space allows the contact with an unknown space [5], at the meantime charming and disturbing that, by a correct mourning elaboration, gives the patient the chance to be separated from his "ill" parts and to go towards a new ontological horizon.

A further possible aim of the initial rehabilitation in early psychoses stages [6] is directly related to the identification of specific cognitive dysfunctions. In fact, apart from pathognomic aspects, functional alterations such as working memory, parallel thoughts, social cognition and metacognition, have shown to be strictly connected to the prognosis of these patients. Recently, interventions able to specifically target dysfunctionalities have shown their effectiveness as revealed by psychosometric systems. Yet, this effect appears to be limited in time since, few weeks-months following, the end of specific surgery task, an extremely clear and marked trend appears to return to the previous stage. It has been hypothesized that the lack of a proper emotional stimulation in patients treated in a laboratory setting – *i.e.* a limited and specific medical context – might thwart the effectiveness of such interventions.

Among the many different rehabilitative activities, therapeutic riding – one of the most important animal assisted therapies currently employed – might play an interesting role in psychiatric rehabilitation [7]. Goal-oriented interaction with horses has been considered particularly effective for individuals with severe mobility impairments (*e.g.* spastic cerebral palsy, multiple sclerosis, spinal cord injury). In fact, rhythmic equine movements imposed on patient's body improves balance, muscle symmetry, coordination and posture [8-13], this enjoyable and challenging activity also resulting in a temporary improvement in patients' mental well-being [8]. The inclusion of horses in psychotherapy sessions (equine-facilitated psychotherapy, EFP) has been reported to be successful resulting in observed psychosocial benefits including an increased sense of self-efficacy and self-esteem [14-17].

Given the lack of controlled studies in this field, main aim of this project was to test the hypothesis that therapeutic riding can act as a non-conventional rehabilitative program in schizophrenia using standardized scales and structured riding sessions. In particular, the hypothesis was tested that a 1-year enrolment in a therapeutic riding program would ameliorate negative and positive symptoms with a greater effect in patients with a recent onset of psychosis.

MATERIALS AND METHODS

Participants

Subjects were 24 patients, males and females, age 18-40, in charge of the Italian Mental Health Services, not involved in other rehabilitation programs, both for their refusal and for previous failures to comply. Ten have been diagnosed with early schizophrenia – no more than 5 years disease – and fourteen with a chronic one. There were neither concurrent diagnoses for drug abuse, mental retardation, epilepsy, horses and highness phobia, nor any relevant neurological or orthopaedic pathology. No one was in acute clinical phase. The patients come from the Mental Health Departments such as Roma F Mental Health Department, Civitanova Marche Mental Health Department, Forlì Mental Health Department, Luce sul Mare Nursing Home (Rimini), Mental Health Department AUSL Fe, (Ferrara). None of the participants had ridden before on a regular basis, all had had prior contact with horses. Twenty specially-trained horses were chosen for the riding sessions, all were quiet and well-schooled. They were adults of different breeds, medium size, in a good state of health. No foals were chosen. The horse's welfare was guaranteed by veterinarians for the entire duration of the study, taking into account consideration about health care, living conditions, work schedules and equipment requirements. They were stabled in 3 x 3 m stalls with straw or shavings bedding, drinkable water and fed with hay and/or concentrates designed for specific needs. Every day horses spend some hours at the paddock.

Setting

Sessions were held at selected Therapeutic Riding Centers (CRE) of Italian Equestrian Federation: Natura e Cavallo (Tolfa, Roma), ASD Le Piane (Sacrofano, Roma), Cavalli delle Fonti (Civitanova Marche, Ancona), Scuderia Sant'Andrea (Forlì),

Casa di Cura Luce sul Mare (Rimini), Ippodromo di Ferrara (Ferrara).

The therapeutic riding setting included the patient, the horse and a therapist specialized in equestrian rehabilitation. The equipe which had in charge the patients also included a mental health physician and a trained veterinarian which ensured animal welfare throughout the study. The space provided for the therapeutic riding sessions was about 20 x 40 m and included fences, stalls, arenas, halters, ropes, bridles, and hitching areas all designed to contain horses and manage their behaviour.

Procedure

Therapeutic riding sessions were held once a week for 24 months, from 2009 to 2010, with a total number of 40 sessions for each patient. The therapeutic riding sessions were preceded by some cognitive and approaching meeting, so the patients could better relate to the animals: indeed, the horse has specific communication codes, and its own mental functioning. The patients, in order to "understand" the horse have to put themselves from the horse point of view, and this metacognitive work is essential in psychiatric rehabilitation of early psychoses.

Each session included: a phase on the ground (grooming, etc) followed by riding, at the end of which a further phase on the ground was planned *(Table 1)*. Each session overall lasted about 1 hour. In the phase 2 (riding), the patient first attended an individual session, and then he/she was included in a small riding group (2-3 patients).

Sessions on the ground were planned with the aim of improve patients' knowledge of the horse (behaviour, anatomy, etc.), harness (english saddle and snaffle), farriery. Moreover during the grooming (phase 1) the patient was able to relate and communicate with the horse, in a tactile and no verbal way. Riding sessions provide patients with riding basic elements (position, mounting, dismounting, walk, trot, etc).

Measurements

Subjects have been tested at the beginning and at the end of the project. Each patient was administered two tests: the brief psychiatric rating scale (BPRS [18]), a widely used instruments for evaluating psychopathology (psychiatric symptoms such as depression, anxiety, hallucinations and unusual behaviour) and symptomatic changes in patients with schizophrenia and the 8-items positive and negative syndrome scale (PANSS [19]), a well-established psychiatric rating system that offers balanced representation of positive and negative symptoms and estimates their relationship to psychopathology. The assessment of patients' symptoms severity according the PANSS scale was based on 45-minute clinical interview as well as reports of family members or primary care hospital workers. These tests have been chosen because of their wide range spread, standards and evaluation; they give quantitative and qualitative estimations, are easy to administer and are widely used also in pharmacological trials. Tests were administered by the medical staff of the Mental Health Departments. No neurocognitive evaluation batteries have been used because qualified psychological staff was lacking in the riding centres. Data for each test were collected with assessment sheets (Microsoft Access 2007), processed with the STATA program using parametric statistics (paired t-tests). We assigned numerical values to each parameter recorded in the assessment sheet and paired t-tests were performed on the scores for each test considered (BPRS and PANSS). Significance was set as $p < 0.05$.

RESULTS

In *Table 2* are summarized BPRS data. Items have been analyzed as a whole (total score considering the 24 items) or grouped into two main clusters: Cluster A (items 1-14 mainly referring to positive symptoms)

Table 1 | *Standardized methodology for the therapeutic riding session.*

Activity	Setting	Work tools	Aims	Duration	Specifics
Phase 1. Ground work and grooming					
Grooming	Group sessions in the stable	Grooming, information and nomenclature of saddlery tools, horse behavioral codes, management of the horse at hand	Acquisition of specific ability. Base for metacognitive work	10' - 20'	Human-horse relationship and ethological and matacognitive comprehension of the horse
Phase 2. Riding					
Riding	Individual sessions and group sessions	Basic riding techniques	Improvement in riding abilities, self esteem and social functioning; reduction of stigma	30' - 40'	Ethological and matacognitive comprehension of the horse
Phase 3. Ground work and grooming					
Work on the ground	Individual sessions	Grooming and horse undressing, familiarization with the patient, integration among the different professional figures	Metacognitive work	10' - 15'	Observation of horses (stables, paddocks), activities of saddlery, farriery, etc.

Table 2 | *Effects of an equestrian rehabilitation program on BPRS scores*

	Total subjects (no. = 24)	First onset disease (no. = 10)	Chronic disease (no. = 14)
Baseline score	80.1 (20.32)	74.1 (16.67)	84.4 (22.14)
Final score	64.1 (17.30)	57.1 (9.98)	69.1 (19.90)
t-test	**t = -6.596; p < 0.001** % diff 20.02	**t = -4.663; p < 0.005** % diff 22.94	**t = -4.572; p < 0.001** % diff 18.19
Cluster A baseline score	46.6 (11.47)	45.5 (8.40)	47.4 (13.51)
Cluster A final score	38.4 (8.86)	36.8 (7.31)	39.6 (9.98)
t-test	**t = -4.951; p < 0.0001** % diff 17.54	**t = -3.934; p < 0.0034** % diff 19.12	**t = -3.23; p < 0.0066** % diff 16.45
Cluster B baseline score	33.5 (11.86)	28.6 (11.23)	37.1 (11.38)
Cluster B final score	25.7 (10.66)	20.3 (5.03)	29.5 (12.06)
t-test	**t = -5.291; p < 0.0001** % diff 23.47	**t = 3.219; p < 0.0010** % diff 29.02	**t = -4.097; p < 0.0013** % diff 20.42

Data are presented as mean scores (standard deviations in parenthesis). Clusters are a subset of items of the test battery.

and Cluster B (items 15-24 mainly referring to negative symptoms). Analyzing the BPRS scores, we can see that at baseline both the early psychotic group and the chronic one had an average value of about 80.1 (74.1 in the early and 84.4 in the chronic disease group). The overall score reached at the end of the one-year equestrian rehabilitation program was significantly reduced, decreasing to 57.1 for patients at onset ($t = -4.663$; $p < 0.005$) and to 69.1 in the chronic group ($t = -4.572$; $p < 0.001$). So, the total average shows a final score equal to 64.1 with a significant overall decrease compared to baseline data ($t = -6.596$; $p < 0.001$). As regards Cluster A, mainly relating to the positive symptoms of the disease, here again we find meaningful changes from baseline ($t = -4.951$; $p < 0.0001$). However, even more interesting appear the changes in Cluster B (negative symptoms) were the differences between beginning and final scores are more evident ($t = -5.291$; $p < 0.0001$; *Table 2*). In *Table 2* have also been described the percent changes from baseline to appreciate the extent of the difference from the beginning to the end of the therapeutic program. In the clinical field, a variation of 20% or more is considered very meaningful, that is appreciable; below such a cut-off we can get a meaningful statistic value, but of low clinical impact. In our case the biggest percentage changes concerned the improvement of negative patient symptoms at the early state (Cluster B of BPRS), such variations were confirmed even in data analysis of the PANSS (see below).

In *Table 3* are summarized the data relating to the PANSS with 8 items. Items have been analyzed as a whole (total score considering the 8 items) or grouped into three main clusters: Cluster 1 (items 1-3 mainly referring to delusions, hallucinations, disorganized behavior), Cluster 2 (items 4-6 mainly referring to affective flattening, poverty of speech, reduction in the range and intensity of emotional expressions) and Cluster 3 (items 7-8, mainly referring to mannerisms, disorganized or unusual thoughts - without delusions). The analysis of the overall score change data was highly significant with a change from 33.3% at baseline to 25.9% at the end of the program ($t = -5.032$;

Table 3 | *Effects of an equestrian rehabilitation program on PANSS scores*

	Total subjects (no. = 24)	First onset disease (no. = 10)	Chronic disease (no. = 14)
Tot baseline score	33.3 (11.54)	26.9 (5.15)	37.9 (12.79)
Tot final score	25.9 (11.69)	20 (4.55)	30.1 (13.48)
t-test	**t = -5.032; p < 0.0001** % diff 22.2	**t = -7.104; p < 0.0001** % diff 25.6	**t = -3.142; p < 0.0078** % diff 20.6
Cluster 1 baseline score	11 (5.47)	8.3 (3.56)	13.0 (5.86)
Cluster 1 final score	9 (5.13)	6.9 (3.00)	10.5 (5.88)
t-test	**t = -3.956; p < 0.0006** % diff 18.2	**t = -3.5; p < 0.0067** % diff 15.7	**t = -3.010; p < 0.010** % diff 19.23
Cluster 2 baseline score	13.9 (4.89)	12.0 (4.22)	15.3 (5.01)
Cluster 2 final score	9.9 (4.74)	7.5 (2.56)	11.6 (5.29)
t-test	**t = -4.730; p < 0.0001** % diff 28.78	**t = -5.235; p < 0.0005** % diff 37.5	**t = -2.746; p < 0.0166** % diff 24.2
Cluster 3 baseline score	8.3 (3.75)	6.6 (3.30)	9.6 (3.65)
Cluster 3 final score	7.0 (3.70)	5.6 (3.30)	8.1 (3.73)
t-test	**t = -3.552; p < 0.0017** % diff 15.7	**t = -2.3717; p < 0.041** % diff 15.1	**t = -2.716; p < 0.017** % diff 15.6

Data are presented as mean scores (standard deviations in parenthesis). Clusters are a subset of items of the test battery.

$p < 0.0001$). With regards to the three Clusters we can notice that Cluster 1 (delirium, disorganization, hallucinatory behaviour) had a score at time 0 of 8.3 in the early psychotics and 13.3 in the more chronic patients, while at the end of the rehabilitation sessions these had changed to 6.9 in the former and 10.5 in the latter group ($t = -3.956$; $p < 0.0006$), although statistically significant a percent variation of this sort cannot be appreciated from a clinical point of view. The Cluster 2 (emotional flattering, social isolation, decreased spontaneity and discourse) however, showed a very meaningful change ($t = -4.730$; $p < 0.0001$) with a percentage variation of the total group equal to 28.78 % (respectively 37.5% in the early psychosis and 24.2% in the chronic group). Finally, Cluster 3 (mannerisms, unusual thought, not delirium) showed a baseline score for the total group of 8.3 at the beginning, and a final score of 7.0 ($t = -3.552$; $p < 0.0017$) again, indicating a significant change in all groups of patients *(Table 3)*.

DISCUSSION

The main aim of this study was to verify whether a horse rehabilitation program could affect negative and cognitive symptoms in schizophrenic patients. Results overall indicate a significant improvement in most symptoms in all groups (both first onset and chronic). In particular, as concerns the BPRS scores, the changes in Cluster B (negative symptoms) were the most evident.

With regards to the three Clusters of PANSS, all showed a significant reduction in the scores. However, as concerns Cluster 1 (delirium, disorganization and hallucinatory behaviour) the percent variation indicates that such difference cannot be appreciated from a clinical point of view. This might indicate that for these symptoms a more intense rehabilitation program might be needed.

One hypothesis that was tested in this work was the potential for a therapeutic riding program to affect differentially first onset *vs.* chronic disease subjects. Psychiatric rehabilitation has historically addressed the treatment of chronic manifestations of the disorder with consequences in terms of loss of autonomy, expressive capabilities and relationships, sense of self and belonging, without addressing the need for early diagnosis and treatment. Italian mental health services show in this sense a rigid structure which does not easily reconcile with the demands/needs of patients at their first onset. As an example, the time lapse between therapeutic and rehabilitation programs, procedures often highly medicalized, even in the case of "unconventional therapies" (such as sports or art therapies), contribute to the general unattractiveness of our services for a younger audience. Thus, there is a need to implement procedures that can reduce the risk of chronicity, extend the cure rate as well as lower the suicide rate and the level of burden and health costs. Only 20-25% of patients are in fact being taken into care at the onset, and a negligible fraction in the prodromal phase. In this study patients were subdivided according to time from disease onset. Although there were no statistically meaningful differences between the two groups (first onset *vs.* chronics), we have to point out that we find the biggest percentage changes of improvement in negative symptoms in patients at early stages of the disease (BPRS B and Cluster 2 of PANSS). It must be also stressed out that, at the end of the study, all those who were in remission at the beginning remained in the same state. By contrast, no worsening of symptoms was observed. This point is really interesting from a health policy point of view. As a matter of fact, the patients entering and remaining steadily in remission result in two important effects on the welfare clinical field. The first, an improvement of pharmacological compliance, with consequent further symptom settling; the second has to do with the decrease of emergency intervention and of hospitalization period in health compulsory treatment or in nursing homes - where all patients were treated before joining the therapeutic riding program. This is likely to be reflected in a decrease of health service costs and, potentially, even an improvement of care-giver quality of life.

These data, though preliminary, given the limited number of patients, indicate that horse-assisted interventions can be a valuable tool for psychiatric rehabilitation [20]. In fact it is able to ameliorate symptoms such as social isolation and apathy − as assessed by BPRS and PANSS (Cluster 2) − which impair social rehabilitation of patients, sharpen the stigma and can push a borderline patient towards frank pathology [21]. These data are in line with other studies in the literature and suggest an important role for horse-assisted rehabilitation programs in psychiatry [8, 14-17]. Compared to other animal-assisted activities [22-27], therapeutic riding compounds physical activity to emotional/cognitive components [28, 29]. Such a combination makes this activity highly suitable for patients in need of a high degree of stimulation, allowing for the type of cognitive and emotional rehabilitation which is particularly meaningful in the case of schizophrenic patients.

The study is still ongoing as a multicentre research project managed by a joint partnership between the Istituto Superiore di Sanità and the Therapeutic Riding Department of Italian Equestrian Federation, with the cooperation of a number of mental health departments, which will apply the methodology so far described in order to collect a larger number of data.

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Conflict of interest statement

There are no potential conflicts of interest or any financial or personal relationships with other people or organizations that could inappropriately bias conduct and findings of this study.

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