Functioning Management and Recovery, a psychoeducational intervention for psychiatric residential facilities: a multicenter follow-up study

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Abstract

Aim Functional Management and Recovery is a standardized Psychoeducational Intervention, derived from "Integro", an effective salutogenic-psychoeducational intervention for people in recovery journey, designed to improve recovery and functioning of individuals with psychotic disorders in Psychiatric Residential Facilities (PRFs). The aim of this study is to evaluate the primary and secondary outcomes of this intervention elaborated specifically for PRFs where evidence based structured interventions seem rare and desirable.

Methods 66 individuals with psychotic disorders were recruited in 9 PRFs dislocated in the North, Center and South Italy and 63 underwent a multicenter follow-up study with a two time-point evaluation (t0, pre-treatment and t1, 6 months;). At each time point, social functioning was assessed as primary outcome by the Personal and Social Performance scale (PSP); furthermore, psychopathological status was assessed by Brief Psychiatric Rating Scale (BPRS), Recovery by Recovery Assessment Scale (RAS), Cognitive Functioning by Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), Stress management by Stress-Scale, Cognitive Flexibility by Modified Five-Point Test (M-FPT), Emotional Intelligence by Emotional Intelligence Index (EI-I), the PRF Atmosphere and the Opinion of users about the PFR by an ad hoc questionnaire. The Abilities Knowledge, the Utility and Pleasantness of sessions were measured by an ad hoc list of items.

Results 63 individuals out of 66, 52 (82,5%) affected by schizophrenia and 11 (17,5%) by bipolar I disorder with psychotic symptoms according to DSM-5-TR completed the study. At the end of the study, 43 (68,3%) were male, 57 (90.5%) were single, 5 (7.9%) engaged, 1 (1.6%) married; 45 (71.4%) unemployed. The total scores of PSP, RAS, BPRS, BANS, Stress management, Abilities Knowledge, Utility and Pleasantness of sessions showed a statistically significant improvement at t1 vs. t0. Two sub-scales out of 5 of M-FPT showed a statistically significant improvement. The Emotional Intelligence, the Unit Atmosphere and the Opinion of Users about PFR improved without statistical significance. Six months after the end of the follow-up study 22 individuals of the sample were dismissed with a very high turnover.

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Conclusions After a six-month follow-up (a short period of time), these results showed improvement in functioning, the primary outcome, as well as in the following secondary outcome variables: RAS, BPRS, BANS, Stress management, Abilities Knowledge, two sub-scales out of 5 of M-FPT, Utility and Pleasantness of sessions. Overall, a remarkable impact of psychoeducational structured intervention on the key Recovery variables is observed. Further studies are needed to address extent and duration of these improvements.

Keywords Psychiatric residential facilities, Functioning, Recovery, Psychoeducational intervention, Salutogenesis

Introduction

Psychiatric Residential Facilities (PRFs) play a relevant role in rehabilitation of individuals with Severe Mental Disorders and complex needs in Italy, covering 43.9% of the budget of a Mental Health Department [1]. A great number of beds in residential facilities has been reported in Italy since 2018 by Barbui et al. [2]; specifically, 46 per 100.000, surprisingly more than in England, where they are 10 per 100.000 (the 2 beds per 100.000 in English Psychiatric Hospitals do not compensate this difference). Nevertheless, PRFs have not received great attention in Italy, except for previous studies that thoroughly assessed the residential care system [3–5], and for few recent studies [6–8]. Despite several interventions, such as the Mental Health Budget, which was proposed by many regions and by the Government to overcome the residential approach [9], the beds raised from 46 in the 2018 [2] to 51.2×100.000 as recently reported [10]. The daily presence rates in PRFs in 2022 [1] were 10.919.751 for the 28.738 users (10.306 for the 27.813 in 2021; 11); the rate of accesses was 249×100.000 in 2022 (240×100.000 in 2021). Last year the Government entrusted a report about PRFs to the National Institute of Health [10]. In the introduction of this report, the length of stay of people admitted in PRFs is well underlined, so that PRFs often become "the house for life"! This is also the conclusion of the analytic investigation of Martinelli et al. [7]: "... the actual average length of stay was 2.9 years (SD 1.0), ranging from 2 to 6 years".

Based on the Report of the National Institute of Health [10] and the results of Martinelli et al. [7], one critical point of this system of care is the lacking administration of evidence-based and recovery-oriented interventions. This may be true everywhere, as suggested by the conclusions of Killaspy et al. [12], underlining that discharge from PRFs is "facilitated by recovery-oriented practice that promotes service users' activities and social skills". This is a very important issue, but much more important, in our opinion, is the other conclusion by the same authors: "Further research is needed to identify effective interventions that enhance such practice to deliver these outcomes" [12]. In fact, in Italy there is a long tradition of providing a lot of activities in PRFs, as described in a recent survey [13]. For instance, cooking and gardening activities reached high percentages in all the facilities, respectively 55.6 and 55.2%, "due to the necessity to increase autonomy in patient's everyday life", followed by art therapies, representing 12.9% of the activities [13]. However, this tradition didn't seem to bring a great contribution to reduce the length of stay in this kind of structures! Also, according to the conclusions of Killaspy et al. [12], we can note that only 13.8% of activities referred to evidence-based treatments, and that the percentage of evidence-based activities was similar among Italian facilities.

We believe that the under-provision of evidence-based treatments is a great issue; along with that, it is also important to consider what kind of treatment is really effective for people living in the PRFs. In our opinion, Killaspy et al. [12] hit the target in stating that research is needed for effective interventions that will improve good existing practice or activities to obtain better outcomes. Among other aims, an intervention must aim at reducing discrepancies of perceived needs between staff and users [8] as well as at better involving relatives in the process of care even if the user is admitted to PRFs, considering that involvement of relatives is about 50% [7]. Recovery-oriented interventions should feature the key-components for recovering, i.e. the effective evidence-based elements necessary to the recovery journey [14]. In addition to Killaspy et al. [12] statement and our previous considerations, the NICE Guidelines [15] ask "what structured group activities are effective at improving interpersonal functioning (social skills) for people with complex psychosis?" in the chapter "Recommendations for research". In fact, the unique rehabilitative approach explicitly suggested by the Nice Guidelines is the Illness Management and Recovery (IMR; 17).

Bearing in mind all these aspects, a team specialized in providing effective psychoeducation interventions elaborated a new approach, specifically conceived for PRFs. This intervention is an adaptation to residential settings of an effective manualized psychoeducational and salutogenetic approach, named "InteGRO", which was conceived to facilitate recovery in the community [17–21]. Whereas IMR (the manual most similar to InteGRO in several aspects, as described in Veltro et al.; 21) has a pathogenetic approach because of some components

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that refer to the nature of the disorder, InteGRO only concerns the improvement of abilities, including social cognition and mindfulness components. InteGRO is inspired to the principles of salutogenesis [22, 23], and to the aspect of "meaningfulness" above all, which we would like to pinpoint as the key element of recovery, as suggested with the locution "The sense of Meaning", by Jaiswall et al. [14]. The intervention we propose shares with InteGRO the setting of pleasant and personal goals, communication skills, problem solving, emotional literacy, the principles of mindfulness and above all the salutogenic approach. This last-mentioned approach is important because it stresses the component of "meaningfulness" from the Antonovsky's "triad" [22]. Furthermore positive psychology, which represents one of the basic foundations of the theory and practice of the salutogenesis, is also well considered. During the several meetings, individuals with mental disorders are guided to give meaning to the stressful events as challenges and, at same time, to see the experiences in a positive light. This action encourages them to commit and to adhere to the treatment in a satisfactory way. This intervention differs from "Integro" because it features a more intensive training (two meetings a week) on personal and social functioning, on reshaping negative thoughts and feelings in a positive way, on detection of early warning signs, on relaxation techniques and because it gives more importance to the other two components of the Antonovsky's "triad", that means "comprehensibility" and "manageability". In addition, this intervention combines the traditional Social Skills Training aimed to the improvement of self-care or communication skills or problem-solving with the efforts to prompt life-style changes like diet, physical activity or relaxation self-training; this work is done by means of a specific schedule with the scores for the evaluation of progress, filled in during the group session. The intervention, which we called "Functional Management and Recovery (FMR)", includes specific sessions with relatives and professionals of the facilities to share the work in progress. The stimulus to elaborate this intervention came from: (a) the lack of appropriate and specific interventions for PRFs as emerged by the Survey in Italy [13], as well as by the results of the contribution of Killaspy [12], also underlined by Nice Guidelines [15]; (b) the motivation and determination of many professionals trained in InteGRO in Italy to apply it also in the residential or semi-residential facilities, against the advice of the Authors. The last point is crucial, because we do not believe that an intervention, even if effective to facilitate recovery in the community, could be used in other settings, entirely or modified, simply based on "experience" or "knowledge" of some professionals. We believe that the appropriateness is a crucial aspect of a rehabilitation

process. We had consistent feedback on this by the experience with a psychoeducational group intervention for acute inpatients [24], which some professionals tried to apply, unsuccessfully, in semi-residential facilities or low intensity residential settings. For all these reasons we elaborated this new approach, encouraged by the professionals of the Mental Health Department of Cuneo, who, enthusiastic of the previous InteGRO training, were interested in proving the effectiveness of this new intervention.

In this contribution we show the results of a multicenter study involving nine PRFs about the effectiveness at six months of the "FMR" intervention, with functioning as a primary outcome. Several other variables have been considered, concerning psychopathology, relapse, admission rates in psychiatric wards, discharge against the advice or shared with professionals, cognitive functions, including flexibility as a specific pattern, level of stress, settled personal goals and their achieving, atmosphere in the facilities.

Materials and methods
Study design
This is a multicenter observational study without a control group, with a 6 month follow-up, two time-point evaluation (t0 = pre-treatment; t1 = post-treatment, 6 months after the beginning of the treatment), carried out on personal and social functioning as the primary outcome; the study was conducted between 2022 and 2023 in individuals with DSM-5-TR [25] schizophrenia or bipolar I disorder with psychotic symptoms, enrolled in 9 intensive Psychiatric Residential Facilities (PRFs). There were no recruitment problems due to COVID-19 since the end of the pandemic state in Italy was decreed on April 1, 2022.
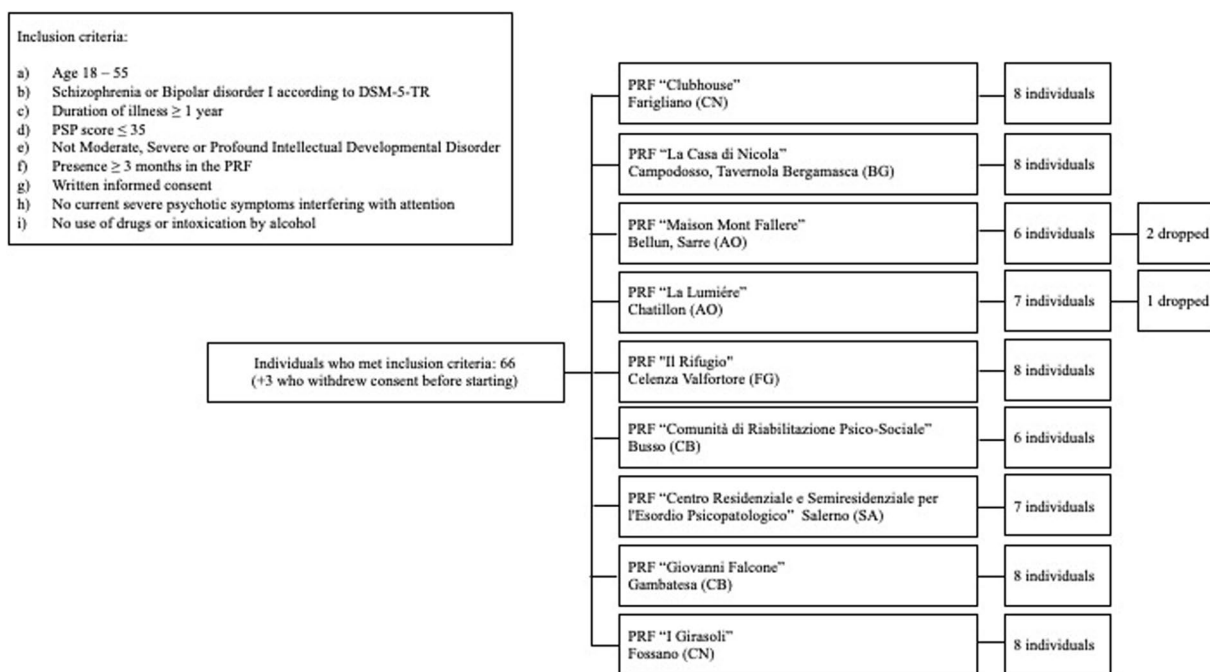
Sample and recruitment
Nine Italian PRFs, well-known to the Research Lead Unit of Cuneo for professional reasons, were selected and invited to take part in the study. In each of these PRFs, people with mental disorders who were clinically stable, without clinical worsening over the past 3 months, were invited to participate if they fulfilled the following inclusion criteria: (a) age between 18 and 55; (b) diagnosis of Schizophrenia or Bipolar disorder I with psychotic features according to the DSM-5-TR criteria; (c) a minimum of one year of duration of illness; (d) a minimum score on the Social and Personal Performance Scale of 35; (e) not Moderate, Severe or Profound Intellectual Developmental Disorder; (f) a minimum presence of 3 months in the PRF; (g) written informed consent to participate in the study and to be evaluated by means of interviews and questionnaires; (h) no current severe psychotic

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symptoms that could interfere with attention; (i) absence of use of drugs or intoxication by alcohol.

Individuals with mental disorders who agreed to participate in the study were consecutively allocated to the experimental group on the basis of their readiness to participate (up to 8); if the admitted eligible for the study were more than 8 they were allocated in a waiting list (up to 4 per center), receiving the intervention at the end of the study in case of positive results. The intervention was discontinued if the recruited individuals: (a) were unable to attend more than 4 sessions; or (b) were hospitalized for a period superior to one month or had 2 relapses or more during the study; or (c) withdrew their consent.

used training sessions of this approach. There are usually 36 weekly meetings, each one lasting 90 min; some of them are carried out twice a week to facilitate learning on the subject. InteGRO is a proactive and promotional intervention that focuses on the improvement of the abilities; there is no reference to symptoms, impairments or deficits. For the PRFs we re-elaborated InteGRO in order to intensify the work on personal and social functioning according to the main aim of promoting Recovery. In this way functioning became the most important aspect of the training. The FMR intervention involves 24 sessions, two per week (whereas InteGRO comprises 36 and 1 per week) with 3 meetings that require the

Inclusion criteria:

a) Age 18 – 55
b) Schizophrenia or Bipolar disorder I according to DSM-5-TR
c) Duration of illness ≥ 1 year
d) PSP score ≤ 35
e) Not Moderate, Severe or Profound Intellectual Developmental Disorder
f) Presence ≥ 3 months in the PRF
g) Written informed consent
h) No current severe psychotic symptoms interfering with attention
i) No use of drugs or intoxication by alcohol

Individuals who met inclusion criteria: 66
(+3 who withdrew consent before starting)

PRF	Individuals	Dropped
PRF "Clubhouse" Farigliano (CN)	8 individuals	
PRF "La Casa di Nicola" Campodosso, Tavernola Bergamasca (BG)	8 individuals	
PRF "Maison Mont Fallere" Bellun, Sarre (AO)	6 individuals	2 dropped
PRF "La Lumiére" Chatillon (AO)	7 individuals	1 dropped
PRF "Il Rifugio" Celenza Valfortore (FG)	8 individuals	
PRF "Comunità di Riabilitazione Psico-Sociale" Busso (CB)	6 individuals	
PRF "Centro Residenziale e Semiresidenziale per l'Esordio Psicopatologico" Salerno (SA)	7 individuals	
PRF "Giovanni Falcone" Gambatesa (CB)	8 individuals	
PRF "I Girasoli" Fossano (CN)	8 individuals	

Description of the intervention

The experimental intervention is based on the psychoeducational and salutogenic intervention named "InteGRO", developed by Veltro et al. [20] in order to facilitate recovery of people with severe psychiatric disorders. InteGRO has proved to be effective in several studies [21–24] for individuals with mental disorders who deliberately decide to undertake a recovery journey in the community, asking mental health service professionals to accompany them in this journey. InteGRO is based on four fundamental modules (definition of Pleasant and Life Goals, effective communication, emotional perception and problem-solving), each comprising different teaching units. For each unit a meeting is scheduled. There are also intermodular educational units to facilitate the acquisition of the skills of single modules. Emotional literacy, emotional perception, social cognition and problem solving are the most

presence of relatives and other professionals of the facility to inform them about the work in progress (units not present in InteGRO). For what concerns relatives, meetings are finalized to establish the possibility to do a family psychoeducation if this work has never been performed before, or how to proceed at home after discharge to help the person in achieving his/her goals. Training sessions not present in InteGRO are: (a) Early Warning Signs; (b) Structured Schedule to Help individuals with mental disorders to Plan Behavioural Changement; (c) Problem Solving training to facilitate the work on the Behavioural Changement Schedule (BCS); (d) 2 training sessions on the Albert Ellis's ABC [26] model to help individuals reshape their negative thoughts and feelings in a positive way; (e) The modified Moritz Model [27] for empathy; (f)

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muscle relaxation training. The BCS represents the fundamental aspect of the work to improve functioning. This schedule contains the basic areas of functioning such as personal self-care, diet, sleep hygiene, motor activity, active mobility, relationships, hobbies and mastery. Each person with mental disorder would specify in two group sessions how he/she intends to work on each area and how to plan and to evaluate the progress in detail. All sessions of FMR and the BCS are illustrated in Appendix 1, 2 and 3. The intervention was carried out by mental health professionals who attended the training course. An ad-hoc manual was developed by the same team that developed InteGRO [20] in order to ensure treatment fidelity.

Training of mental health professionals in the intervention

The training intervention consisted of one residential meeting of 5 days, 8 h a day, carried out in a Residential Structure near Cuneo in order to: (a) inform professionals on the purposes and the methodology of the study; (b) train 2 professionals from each PRF in FMR; (c) train 2 researchers from each PRF on the assessment tools and test inter-rater reliability. In addition, we had five online supervision meetings, lasting 4 h; moreover, a regular phone and e-mail supervision was carried out. The mental health professionals who participated in the residential training were psychiatrists (10%), psychologists (23%), psycho-social rehabilitation technicians (10%), psychiatric nurses (21%), occupational therapists (8%), educators (23%), pedagogists (5%). All psychologists were trained in cognitive behavioral therapies. All psycho-social rehabilitation technicians were trained in Social Skills Training and psychoeducational intervention. All professionals had previously been fully trained in "InteGRO".

Assessment instruments

The primary outcome of the study was the improvement of the personal and social functioning after the provision of the intervention at 6 months, assessed by the Personal and Social Performance Scale (PSPS; 29), derived from the version of the DSM-IV Social and Occupational Functioning Assessment Scale (SOFAS); compared to the SOFAS, the PSP has better face validity and psychometric properties. The PSPS evaluates personal and social functioning through a semi-structured interview and the information available from the acquaintances and health workers. There are four main areas: (1) socially useful activities (including working and studying); (2) personal and social relationships; (3) taking care of appearance and hygiene; (4) disturbing and aggressive behaviors. The total score ranges from 0 (worst possible functioning) to 100 (excellent functioning).

Other outcome measures were evaluated by means of:

- The Recovery Assessment Scale (RAS; 30), one of the most used recovery measures in recovery-oriented practice evaluation for people with mental health conditions. Its psychometric properties have been extensively studied: it shows good reliability (i.e., internal consistency, test-retest reliability, interrater reliability), validity (i.e., consistent factor structures across different samples, expected associations with relevant constructs), and utility for intervention. It consists of five factors, corresponding to different features of the recovery processes: (1) personal confidence and hope; (2) willingness to ask for help; (3) goal and success orientation; (4) reliance on others; (5) no domination by symptoms.

- The Italian version of Brief Psychiatric Rating Scale (BPRS; 31–33), a psychopathological hetero-evaluation scale consisting of 24 items. Each item is assessed on a Likert scale with 7 coding levels ranging from 1 (absent) to 7 (very severe). From a factorial analysis, five symptomatic clusters were identified: "disorganization" (range 4–28); "negative affectivity" (range 6–42); "positive symptoms" (range 4–28); "expanded affectivity" "negative symptoms" (range 3–21).

- The Stress Scale [33], made up of 9 items taken from the well-known and widespread Goldberg tool for investigations in routine conditions, with a dichotomous yes-no (yes-score was considered equal 1, no-score was considered equal 2). The Cronbach's alpha was evaluated at >.70 in all studies in which it was used. The test-retest reliability was assessed and met the criterion of >.70 in all cases. Two factor model best describes the scale: Perceived helplessness and Lack of self-efficacy.

- The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS; 35): a brief, individually administered test measuring attention, language, visuospatial/constructional abilities, immediate and delayed memory. It consists of 12 subtests, which yield five Index scores and a Total Scale score. Stimuli are contained in a wire-bound, easel-type booklet, making the test easily portable. Clinical validity study of the RBANS suggests that it is sensitive both in terms of detecting and characterizing cognitive deficits.

- The Modified Five-Point Test (M-FPT; 36) is a test for measuring non-verbal fluency (figurative) of executive functioning, linked to cognitive flexibility. The main aspects assessed are: cognitive flexibility, presence or absence of perseveration and strategic performance. Consequently, scores are of 3 types: (1) Unique Drawings (UDs), i.e. number of valid drawings not produced before; (2) Cumulative strategies (CSs) i.e. number of UDs produced with a particular strategy that can be either enumerating

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(CSse) or rotative (CSsr); (3) Error index (Errl), i.e. percentage of perseverative drawings or breaking of rules (errors) on the total number of drawings. The aim of the Italian validation study [35] was to collect normative data for a version of the Five-Point Test (M-FPT), which psychometric properties were well known from the original validation studies, administered to a sample of Italian healthy adults aged 16–60. The availability of these normative data allows one to assess individual's performance with reference to cut-off scores.

– The Emotional Intelligence Index (EI-I; 37) is a self-report questionnaire consisting of 15 items characterized by 5 factors as resulted by construct validity: intrapsychic, interpersonal, impulsivity, coping, self-efficacy with a total score ranging from 15 (absence) to 60 (the highest score). The cut-off for the presence of Emotional Intelligence is 22. The overall internal consistency of the Index assessed with Cronbach's alpha was found to be 0.72. The concurrent validity was shown to be 0.74 ($p < 0.01$) with $r^2 = 0.55$.

– Psychiatric Residential Atmosphere Schedule (PRAS), is an ad hoc simple schedule adapted from the Ward Atmosphere for inpatients, which has shown good reproducibility results [37]: agreement exceeded 90% with a Cohen's kappa > .70. It is filled twice a day (2 pm and 8 pm) by two professionals that work in the PRF in order to obtain a score about the atmosphere in the facility and also the presence of aggressive behavior. The score ranges from 1 (or white color) meaning no problem at all and also positive communication up to 5 (or red color), meaning that one or more individuals with mental disorders have destructive or violent or aggressive behavior. For each item well detailed scoring instructions are available.

– The Patient Opinion about the PRF (POPReF), is an ad hoc list of items, adopted by the ABC questionnaire [38] that evaluates the opinion of people with mental disorders about the comfort in the facility, the availability and the kindness of professionals, the information provided about the illness, the drugs, the opinion about the quality of care and satisfaction about hospitality. The ABC questionnaire showed in the study of validation [38] good psychometric properties: test-retest (> .66); concurrent validity with the r' Spearman correlation coefficients of 0.54 ($p < .0001$); internal consistency with the value of Cronbach's alpha of 0.90; discriminant validity assessed by Kruskal-Wallis equal to 16.2 ($p < .0001$).

– The Abilities Knowledge Schedule (AKS) is an ad hoc list of items that evaluate the Knowledge of ability to define goals (1 item, score 1 if the reply is good), com-

munication skills (4 items, score 1 for each item if the replay was good) and problem solving (score one for each step if it has been considered in the solution of a problem) with scores ranging from 0 to 11. The score 6 is considered a good result.

– Utility perception of the meeting was measured with a score ranging from 3 (Not at all) to 8 (very very much).

– Pleasantness of the meeting was measured with a score ranging from 3 (Not at all) to 8 (very very much).

Statistical analysis

For all the variables with parametric distribution the average ± sd was calculated; for all variables with non-parametric distribution the median and range were calculated. The pre-post comparison of the variables with parametric distribution was performed by paired two-sample t-tests. For non-parametric distribution variables the Wilcoxon signed-rank test was performed. Pearson correlation coefficient or Spearman correlation coefficients were calculated for bivariate correlations between parametric and non-parametric variables, respectively. A forward stepwise linear regression was used to identify possible predictors of the primary outcome variable (PSP at t1) out of the psychopathological, recovery, Cognitive, Stress, Emotional Intelligence, Atmosphere, Opinion of users, Abilities Knowledge, Utility and Pleasantness variables. At each step, variables were chosen based on *p*-values (< 0.05). A similar forward stepwise linear regression analysis was carried on to identify possible predictors of Recovery as assessed by RAS at t1. The SPSS version 29.0.2.0 software for macOS (IBM Corp. Released 2021. IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp) was used for statistical analysis. All methods were carried out in accordance with relevant guidelines and regulations.

Human ethics and consent to participation declarations
Ethical approval of the experimental protocols

The study was conducted according to the Declaration of Helsinki. The protocol was submitted to and approved by the relevant ethical and review boards "Comitato Etico Interaziendale A. O. "Santa Croce e Carle di Cuneo AA.SS.LL. Cuneo 1, Cuneo 2, Asti, Via Monte Zovetto, 18–12100 CUNEO, reference "ASL CN1/PSICH. 4" (Report 75/22 of 27/04/2022; prot. n. of General Management Resolution Measure 01121153 of 09/09/2022). Prior to their participation in the study, all individuals were fully informed about the study scope, objectives, methodology, and components, and they provided written informed consent. They were also informed that their

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participation was voluntary and they could withdraw from the study at any time. Informed consent of the participants was obtained before the study.

Results

Recruitment process and attrition rate

All 9 centers contacted to participate to the study and run the intervention after training of mental health professionals. Each center was expected to recruit up to 8 individuals with mental disorders according to the criteria illustrated in the methodology. In 6 Centers the goal of 8 individuals recruited was achieved; in 3 centers there were 7 recruited people, for a total of 69. 3 people, 2 with schizophrenia and 1 with bipolar I disorder, refused to be evaluated and to participate before starting the study; the retention rate was 4.3%. The sample starting the study was 66 individuals. Other three left the study during the first month: one started to work, one left the PRF for another PRF and one left the PRF against the advice of clinicians. At the end of the study, total number of the sample was 63.

The socio-demographic characteristics and diagnosis of the sample (Table 1)

The 66 individuals with mental disorders that started the study were: 46 (70%) male, 20 female (30%); 61 (92,4%) were single, 4 (6.1%) engaged; 1 (1.5%) married; 50 (76.7%) unemployed. 54 (81.8%) users were affected by schizophrenia, 12 (18,2%) by bipolar I disorder. At the end of the study, 43 (68,3%) were male, 57 (90.5%) were single, 5 (7.9%) engaged, 1 (1.6%) married; 45 (71.4%) unemployed. None of the study participants contracted COVID: mitigation recommendations were still in place inside the facilities and visitors were allowed to enter with a mask and with social distancing. No additional procedures were required for admissions and discharges due to Covid-19, except a swab upon admission.

The primary and secondary outcome of the sample and the statistical results (Table 2)

During the period of the 3 months before starting the study (T0) 5 admitted people (76%) had 5 admissions to hospital, 2 of them (40%) with a Compulsory Treatment Order (CTO). During the period of the 3 months before concluding the study (T1) 5 people had 5 admissions to hospital, 1 of them (20%) with a CTO.

During the six months after the t1 follow-up 22 (33,33%) people with mental disorders were discharged, 1 of them left the PRF against the advice of clinicians. At t0 2 individuals with mental disorders had a sheltered employment, while at t1 6 people did. At t0 there were no

Table 1 Socio-demographic characteristics

Gender	Male 46 (70%); Famale 20 (30%)
Marital Status	Single 61 (92,4%); Engaged 4 (6.1%); Married 1 (1.5%)
Employment	unemployed 50 (76.7%); employment 16 (23,3%)
Diagnosis	schizophrenia 54 (81.8%); bipolar I disorder with psychotic symptoms 12 (18,2%)

people with vocational training, whereas at t1 there was one.

PSP

At t0 the median was 52.50 (range = 35–65); at t1 it was 58.50; Wilcoxon signed-rank Test was significant (z = 4.653; p = .000).

The stepwise linear regression analysis was able to identify a significant final model ($F_{(4,58)}$ = 51.7; p < .001), which explained 76.6% of variance in PSP at t1. The model identified as predictors for PSP t1: the personal and social performance level at t0 (FPS t0: Beta = 0.711; t = 10.763; p < .001), item 22 "distractibility" from BPRS at t1 (Beta=-0.263; t=-4.220; p < .001), visuospatial and visuo-constructional abilities at RBANS (Beta = 0.181; t = 2.862; p = .006), number of voluntary admissions in a psychiatric ward during the year before the intervention (Beta=-0.150; t=-2.329; p = .023).

RAS

At t0 the average was 88.65 (sd: ±19.58); at t1 it was 94.84 (sd: ±22.32); Student's t test was significant (T$_{[62]}$=-3.086; p = .003). All subscale tests were significant. At subscale "Personal confidence and hope" at t0 the mean was 31.92 (sd: ±7.72), whereas at t1 it was 34.38 (sd: ±9.47); t$_{[62]}$=-2.52; p = .014. At "No domination by symptoms" at t0 the mean was 9.57 (sd: ±3.28), at t1 it was 10.59 (sd: ±3.21); t$_{[62]}$=-2.51; p = .015. At "Goal and success orientation" the median at t0 was 20.00 (range = 10–43), at t1 it was 20.50; Z = 3.58, p = .000. At "Reliance on others" the median at t0 was 14.00, at t1 it was 15.00; Z = 2.24; p = .025. At "Willingness to ask for help" at t0 the median was 12, at t1 was 12; Z = 2.33; p = .020.

The stepwise linear regression analysis was able to identify a significant final model ($F_{(3,59)}$ = 44.75; p < .001), which explained 67.9% of variance in RAS at t1. The model identified as predictors for RAS at t1: RAS level at t0 (Beta = 0.560; t = 7.275; p < .001); the emotional intelligence level (EI-I) at t1 (Beta = 0.349; t = 4.227; p < .001); the subjective experience of users in the PRF at t1(Beta = 0.177; t = 2.237; p = .029).

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Table 2 Primary and secondary outcomes

Variables	Test	T0	T1	T1 vs. T0
Personal and Social Performance	Wilcoxon signed-rank	52.50 (35–65)	58.50 (40–75)	$Z = 4.653; p = .000$
Recovery Assessment Schedule, RAS (total)	Student's t	88.65 ± 19.58	94.84 ± 22.32	$T_{[62]} = -3.086\ p = .003$
RAS 1: personal confidence and hope	Student's t	31.92 ± 7.72	34.38 ± 9.47	$T_{[62]} = -2.52\ p = .014$
RAS 2: no domination by symptoms	Student's t	9.57 ± 3.28	10.59 ± 3.21	$T_{[62]} = -2.51\ p = .015$
RAS 3: goal and success orientation	Wilcoxon signed-rank	20.00 (10–43)	25.50 (5–46)	$Z = 3.58; p = .000$
RAS 4: reliance on others	Wilcoxon signed-rank	14.00 (5–19)	15.00 (4–21)	$Z = 2.24; p = .025$
RAS 5: willingness to ask for help	Wilcoxon signed-rank	12 (5–15)	12 (3–15)	$Z = 2.33; p = .020$
BPRS tot	Wilcoxon signed-rank	43 (28–82)	39 (28–64)	$Z = -4.87; p = .000$
RBANS tot	Wilcoxon signed-rank	73 (57–112)	74 (55–125)	$Z = 3.39; p = .001$
RBANS Immediate Memory	Wilcoxon signed-rank	75 (40–126)	81 (40–129)	$Z = 2.92; p = .004$
RBANS Delayed Memory	Wilcoxon signed-rank	71.50 (54–124)	75 (48–129)	$Z = 2.17; p = .030$
RBANS Attention	Student's t	75.95 ± 15.92	77.87 ± 19.43	n.s.
RBANS Language	Wilcoxon signed-rank	77.50 (61–102)	78 (62–115)	n.s.
RBANS Visuospatial/constructional	Student's t	83.13 ± 19.38	86.48 ± 17.89	n.s.
Modified 5-point test UDS	Wilcoxon signed-rank	0.00 (0–3)	1.00 (0–4)	$Z = 3.19; p = .001$
Modified 5-point test Errl	Wilcoxon signed-rank	6.50 (0–77)	5.00 (0–50)	n.s.
Modified 5-point test Css	Wilcoxon signed-rank	0.00 (0–4)	0.00 (0–4)	$Z = 1.99; p = .046$
Stress	Wilcoxon signed-rank	10.37 (0–18)	11 (0–18)	$Z = -2.84\ p = .004$
Emotional Intelligence – Index (EI-I)	Student's t	41.51 ± 7.71	43.27 ± 8.08	n.s.
Facility Atmosphere (PRAS)	Student's t	1.95 ± 0.79	2.01 ± 0.85	n.s.
Patient Opinion about the PRF	Student's t	62.98 ± 10.84	64.46 ± 10.39	n.s.
Ability Knowledge Schedule (AKS)	Wilcoxon signed-rank	2.50 (0–9)	6.00 (0–11)	$Z = 4.79; p = .000$
Utiliy perception of the meeting	Student's t	6.0 ± 1.19	7.07 ± 1.40	$T_{[62]} = -4.07; p < .001)$
Pleasantness of the meeting	Student's t	6.01 ± 1.25	6.85 ± 1.42	$T_{[62]} = -3.191; p = .001$

BPRS

At t0 the median was 43 (range = 28–82), at t1 was 39 [27–63]; Wilcoxon signed-rank Test was significant ($Z = -4.87; p = .000$).

RBANS

The total score median at t0 was 73 (range = 57–112), at t1 it was 74 (55–125); Wilcoxon signed-rank Test was significant ($Z = 3.39; p = .001$). Two subscales were significantly improved ("Immediate Memory" and "Delayed Memory").

At subscale "Immediate Memory" the median at t0 was 75 (range = 40–126), at t1 it was 81 (40–129); $Z = 2.92$, $p = .004$. At "Delayed Memory" the median at T0 was 71.50 (range = 54–124), at T1 it was 75 (48–129); $Z = 2.17$, $p = .030$. At "Attention" the mean at t0 was 75.95 (sd: ±15.92), at t1 it was 77.87 (±19.43); $p = $ n.s. At "Language" the median at t0 was 77.50 (range = 61–102), at t1 it was 78 (62–115); $p = $ n.s. At "Visuospatial/constructional abilities" the mean at t0 was 83.13 (sd: ±19.38) at t1 it was 86.48 (±17.89); $p = $ n.s.

STRESS scale

At t0 the median was 10.37 (range = 0–18), whereas at t1 it was 11 (0–18); Wilcoxon signed-rank Test was significant ($Z = -2.84; p = .004$).

M-FPT

The UDs score showed a median at t0 of 0 (range = 0–3), whereas at t1 it was 1 (0–4); Wilcoxon signed-rank Test was significant ($Z = 3.19; p = .001$).

The ErrI score showed a median at t0 of 6.5 (range = 0–77), whereas at t1 it was 5 (0–50); $p = $ n.s.

The Css score showed a median of 0 (range = 0–4) both at t0 and at t1; Wilcoxon signed-rank Test was significant ($Z = 3.19; p = .046$).

EI-I

At t0 the mean emotional intelligence was 41.51 (sd: ± 7.71), whereas at t1 it was 43.27 (±8.08); $p = $ n.s.

PRAS

The mean at t0 was 1.95 (sd: ± 0.79), whereas at t1 it was 2.01 (±0.85); $p = $ n.s.

POPReF

At t0 the mean was 62.98 (sd: ± 10.84), whereas at t1 it was 64.46 (± 10.39); p = n.s.

AKS

At t0 the median was 2.50 (range = 0–9), whereas at t1 it was 4.00 (0–11); Wilcoxon signed-rank Test was significant (Z = 4.79; p = .000).

Utility perception of the meeting

At t0 the mean was 6.0 (sd = ± 1.19), whereas at t1 it was 7.07 (sd = ± 1.40); Student's t test was significant ($T_{[62]}$=-4.07; p < .001)

Pleasantness of the meeting

At t0 the mean was 6.01 (sd = ± 1.25), whereas at t1 it was 6.85 (sd = ± 1.42); Student's t test was significant ($T_{[62]}$=-3.191; p = .001)

Discussion

To our knowledge, this is the first multicenter study testing the effectiveness of a psychoeducational recovery-oriented intervention, based on a salutogenic approach, with the explicit goal to improve personal and social functioning in the PRF. We observed a statistically significant improvement in the primary outcome (personal and social functioning) as well as in several secondary outcomes (Recovery; psychopathological status; Cognitive Functioning; stress management; Abilities Knowledge; Utility and Pleasantness of session). The Emotional Intelligence, the Unit Atmosphere and the Opinion of Users about PFR improved without statistical significance. Six months after the end of the follow-up study 22 individuals were dismissed with a very high turnover.

Most papers about PRFs are descriptive about the structures, the programs and the interventions or activities, often described, as if they were the same thing! Some papers explore the "quality" of the program [7] or the factors predicting discharge [39]. On the basis of the latest Italian survey [13], the evidence-based practice accounts for 13.8%, but as we wrote previously the question is: are the interventions usually applied in the community really effective in the PRF context, where social functioning and above all functional capacity are limited? In fact, the functioning capacity predicts the functioning of individuals with psychotic disorders as demonstrated by Galderisi et al. [40]. Nevertheless, the relevance of Cognitive Remedation generalizability to real-world functioning "should clearly be weighed against the context of care" as stated by Vita et al. [41]. For these reasons, our intervention, one of the first conceived on purpose to be appropriate for PRFs,

seems interesting because the aim is to improve functioning in the PRF, where functioning in the real life is restricted. The only study that proposes the same type of intervention is Magliano et al. [42] called CIGI, "Combined Individual and Group Intervention"; the CIGI integrates the Vado Approach [43] with some parts (communication skills and problem solving) from the Falloon approach [44]. However, it does not appear comprehensive and its effectiveness on functioning seems discrete in the only study published [43].

The results of our study highlight a positive impact of the intervention on the majority of outcome indicators. Regarding the psychopathological component, it is worth recalling that the approach is not aimed at improving clinical symptoms, since pharmacological adherence is guaranteed 24/24 hours by professionals; the symptoms are stable and controlled by drugs. Nevertheless, in our study the *post hoc* comparison was significant, for BPRS total score at t1 vs. t0. Furthermore, the trend of clinical crises was better during the follow-up, as one CTO occurred compared with the two before the intervention; the same number of hospital admissions occurred. Some hospital admissions in the follow-up period could be explained by the potentially stressful intensity of this intervention (twice a week). Despite our beliefs, it has worked like a good investment in a longer period: in fact, we had a high percentage (33% of users) of discharged people at one year, whereas the PRF turnover in Italy is reported as not satisfactory [1].

The greatest impact of the intervention remains on personal and social functioning, the primary outcome, as predictable from the previous studies with the progenitor intervention "InteGRO" [18–21]. The variables predicting functioning at t1 are Social Functioning at t0, distractibility at t1, visuo-spatial abilities at t0, and admissions at t0. These results are very interesting, because in a complex network analysis on 921 individuals with psychotic disorders, Galderisi et al. [45] found that visuo-spatial learning and attention were directly connected with functional capacity. At the same time, it is not surprising that previous functioning is a predictive variable of the amelioration of personal and social functioning. For instance, social competence, more than social cognition, is directly linked to interpersonal functioning [40]. Based on these results, on data reported in specific literature and on the observations by the trainers of this intervention, the improvement on functioning may be due to:

a) the work with the Behavioural Changement Schedule" (BCS) that commits the person to plan and evaluate the goals of changing in the most important components of personal and social functioning.

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Also prompting individuals to define Pleasant and Life Goals is probably linked to the improvement of functioning. This work is similar to the rehabilitation approach – effective and widespread in Italy - called "Vado" [46];

b) the problem-solving training, the cognitive restructuring and the emotional literacy. The implementation of problem-solving strategies within psychoeducational interventions has an "impact on clinical and functional outcomes, by providing patients with long-lasting resources to manage daily life more effectively" [48]. In previous studies we discussed this and the relationship between cognitive functions, especially planning activity and Problem Solving [21], according to the theory about the Real World Problem Solving theory [21]. InteGRO and FMR dedicate many training sessions to emotional literacy and to recognizing the emotions on the other faces; in fact, the importance of emotional processing for social functioning in people with psychotic disorders has been well known for years [48]. Also in the more recent study, Galderisi at al. [45] pinpoint that the connection between emotion recognition and functional capacity highlights the role of social and emotional processing in general psychosocial functioning. According to Thaler et al. [49], people capable to comprehend social and emotional stimuli acquire better interpersonal skills needed for some functional capacity tasks (e.g. communication skills). On this basis, one could also consider the communication skills training, based on the emotional literacy as scheduled in FMR, boosting feedforward functioning;

c) the salutogenic approach and the use of positive psychology. The high levels of positivity, which means to see life and experiences in a positive light, defined in the literature as 'a quite pervasive mode of viewing and facing reality that affects the ways people evaluate their subjective experiences' [50], was associated to better functioning [51]. Martinelli et al. [52] observed that people with a diagnosis of schizophrenia and higher "positivity" levels measured by an appropriate scale showed improved interaction skills, work abilities, and engagement in pleasant activities.

The improvement in functioning surely explains the high turnover as previously mentioned.

Functioning is a priority target in recovery-oriented interventions [53]. In fact, we observed good results in functioning as well as in Recovery assessment with a statistically significant improvement in RAS total score and in RAS subscale "Goal and success orientation". These results should be considered very good if you look at the conclusion of a recent study about functioning in schizophrenia spectrum disorder (SSD): "Rehabilitative programmes implemented in RFs for people with SSD should be improved: many people who live there spend a significant amount of time doing nothing" [54]. The predictive variables for RAS at t1 were the RAS level at t0, the emotional intelligence index at t1 and the subjective experience of users in the PRF at t1. This confirms what has been reported in the specific literature of Recovery. In fact, *seeing oneself* as a person in recovery is a central part of the recovery process itself, associated with both better wellbeing and better recovery-outcome as conceptualized within the recovery model [55]. Simply, the journey of recovery is an on-going self-directed process which allows a person to have a better life despite the limitations posed by his/her condition. In that way the best possible condition of Recovery became itself a good predictor of recovery-outcome as if it were an ingredient of hope [56]. At the same time, it is interesting that emotional intelligence was a predictor of Recovery. Emotional intelligence means the Theory of mind, a field of knowledge partially explored in schizophrenia spectrum for what concerns functioning and recovery; nevertheless, very promising [57]. Our results could give a little contribution. The variable concerning the subjective experience about the structure, in term of good inter-relationship with others, confirms that a good environment facilitates the process of recovery. In fact, users' experience of quality of interpersonal relationships is prospectively associated with recovery as well as good interpersonal relationships and interactions are central drivers of recovery in people with psychotic disorders [58]. In addition, we strongly believe that the BCS plays a relevant role in functioning, due to combining traditional aspects of behavioral rehabilitation, for instance on self-care or sleep-hygiene, with defining detailed goals of behavioral changes in lifestyle, such as diet, active mobility, mastery with relaxion-training or mindfulness or yoga or tai-chi. Working in groups encourages people and creates supportive pair-to-pair interactions to fill the schedule and to set realistic data to evaluate progress [59].

Another important improvement regards the level of stress. Managing stress is of crucial importance because it is a key variable of illness onset, relapse and recurrences as known for years [60, 61] and it has been recently well studied for peculiar aspects [62] as well as for identification of specific and effective interventions [63]. Since stress remains at high levels after the Covid-19 pandemic and lockdown [64], effective stress interventions, as considered in the FMR, are now and in the future of vital importance. Actually, at a population level, it is really pertinent to consider stress as a modern epidemic of human life [65]. We believe that also

the mindfulness techniques as suggested by the recent scientific literature [66], used in our approach within the meetings of "calm your mind" and related homework, with also related booster sessions gave a great contribution to improve stress-management.

The good results in the cognitive flexibility are encouraging, since our intervention gave much importance to these cognitive deficits, prompting cognitive flexibility above all by the meetings of problem solving training and related homework. The cognitive flexibility, as known, is important "to appropriately adjust one's behavior according to a changing environment" [67, 68] and is associated with resilience to negative life events and stress in adulthood [69]. However, despite its importance, a comparison of this variable is not possible because there are few data about the psychiatric rehabilitation in PRFs; nevertheless, Dajani et al. [67] stated that more studies about cognitive flexibility are required. The meetings on problem solving also had impact on the other executive functions. We observed an improvement trend in all cognitive variables even if only for immediate memory there was statistical significance. In our opinion, problem solving training works as an indirect and a global strategy of cognitive remedation. This fact could find some explanation in the recent pilot fMRI study of Alescio et al. [70]. They observed that "innovative thinking was influenced by reasoning, whereas it was influenced by cognitive flexibility following problem-solving training". These findings highlight that an intervention based on problem solving "promotes innovative thinking by changing the way subjects recruit and use relevant cognitive processes. Modifications in the resting-state connectivity of attention, default mode and visual networks were observed in the problem-solving group". After all this intervention, it is not sufficient to significantly improve cognitive function and specific programs are needed for this purpose, considering the role that cognitive functions play in improving social functioning [71] and Recovery Process [72], as we also wrote previously debating the role of problem-solving training.

The observed improvement of atmosphere inside the facility during the short follow-up period is also important, even if it does not reach statistically significant differences. As known, in psychiatry the Ward/Residential atmosphere or climate has been found associated with better outcomes and a better therapeutic alliance between the individuals with mental disorders and staff in several studies [24, 73]. Probably, also in this study the amelioration of atmosphere gave a contribution on the therapeutic alliance, since we had only 3 dropouts, in the first month, and 1 CTO.

We are not surprised by the improvement in the knowledge of abilities such as definition of goals, communication skills and problem-solving, because users had probably not carried out similar intervention before. However, the improvement of knowledge showed that the training worked very well.

Last, but not least: the improvement of Utility perception and Pleasantness of the sessions by participants, which represents a subjective feed-back for the intervention, mirroring the objective hard data of functioning improvement.

Conclusions

The purpose of this study was to assess improvements in functioning after an innovative, recovery-oriented program conceived for Psychiatric Residential Facilities; in fact, in these structures effective treatments seem to be rare and desirable. The strengths of this intervention is that is structured, manualized, and one of the first based on a psychoeducational and salutogenic approach for PRFs. In addition it can be integrated with similar approach, for instance the VADO approach in Italy and above all programs for cognitive remedation since its contain the approach based on problem solving that facilitate the improvement of cognitive functions. It may also be considered efficient, because of the limited number of sessions and the improvement consolidating over time, on the basis of good results we observed in this study. The limit of this program could concern the organizational problem of the structure (i.e., two meeting per week, a good coordination among the professionals that train the admitted and the staff of the PRF above all to sustain participant in pursuing their goals) and the lack of the involvement of relatives.

The strength of the study is the large number of variables explored, the methodology and that is a multicenter study in different geographics context. The limit is that is a not a randomized Study with the problem of the generalizability of the result. As a consequence, further studies, with randomized controlled design and with a longer follow up are needed to prove the efficacy of Functional Management and Recovery. We can then anticipate that a one-year multicenter controlled randomized study of a similar intervention has just finished with good results as observed by professionals; this intervention has been modified for the addition of the active group-resources to support functioning in real-life also in order to correct the lack of involvement of relatives.

Abbreviations
AKS	Abilities Knowledge Schedule
BCS	Behavioural Changement Schedule
BPRS	Brief Psychiatric Rating Scale
CTO	Compulsory Treatment Order
EI-I	Emotional Intelligence Index
FMR	Functional Management and Recovery

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IMR   Illness Management and Recovery
M-FPT   Modified Five-Point Test
POPReF   Patient Opinion about the PRF
PRAS   Psychiatric Residential Atmosphere Schedule
PRFs   Psychiatric Residential Facilities
PSPS   Personal and Social Performance Scale
RAS   Recovery Assessment Scale
RBANS   Repeatable Battery for the Assessment of Neuropsychological Status

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12888-024-06033-2.

Supplementary Material 1.

Declarations

Ethics approval and consent to participate

The study was conducted according to the Declaration of Helsinki. The protocol was submitted to and approved by the relevant ethical and review boards "Comitato Etico Interaziendale A. O. "Santa Croce e Carle di Cuneo AA.SS.LL. Cuneo 1, Cuneo 2, Asti, Via Monte Zovetto, 18–12100 CUNEO, reference "ASL CN1/PSICH. 4" (Report 75/22 of 27/04/2022; prot. n. of General Management Resolution Measure 01121153 of 09/09/2022). Prior to their participation in the study, all individuals were fully informed about the study scope, objectives, methodology, and components, and they provided written informed consent. They were also informed that their participation was voluntary and they could withdraw from the study at any time. The informed consent of the participants was obtained before the study.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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