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## Does cognitive remediation modify the use of psychiatric services and the patterns of care of patients with schizophrenia?

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### ABSTRACT

The use of inpatient and outpatient psychiatric services were assessed in the 12 months before and after a cognitive remediation (CR) intervention or treatment as usual (TAU) in a sample of 84 patients with schizophrenia who previously underwent an effectiveness study of CR.

A smaller number and shorter duration of hospitalizations in acute wards and a higher total number of outpatient and rehabilitative interventions, as well as a more constant, intensive and articulated rehabilitation in the 12 months after the intervention were found in patients who received CR, compared with those who received TAU. CR may modify the use of psychiatric services and the patterns of care of patients with schizophrenia.

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### 1. Introduction

Cognitive impairment is recognized as a core feature of schizophrenia (Green et al., 2004; Keefe et al., 2006), and considered to be a relevant predictor of psychosocial outcome (Bowie et al., 2006, 2008) and quality of life (Alptekin et al., 2004). In recent years, various cognitive remediation (CR) interventions have been developed (Vita et al., 2014) and their effectiveness in improving cognitive performance, symptoms and psychosocial functioning has been demonstrated (Grynszpan et al., 2010; McGurk et al., 2007; Medalia and Saperstein, 2013; Roder et al., 2011; Wykes et al., 2011). However, the impact of CR on the use of psychiatric services and/or patterns of care of patients who receive such treatment is not known. Only few studies analysed the issue of the cost of treatment of patients undergoing CR (Wykes et al., 2003; Patel et al., 2006, 2010; Reeder et al., 2014), with mixed evidence of cognitive status and cost relationship (Patel et al., 2006), possible cost effectiveness (Patel et al., 2010; Reeder et al., 2014), and increase of day-care costs reflecting an increased use of day-care services after CR (Wykes et al., 2003). However, no study has specifically analysed the impact of CR on patterns of psychiatric care in schizophrenia and very few studies have analysed the impact of psychosocial interventions in general on the use of psychiatric services (Hastrup et al., 2013; Phanthunane et al., 2011; van der Gaag et al., 2011; Van Meerten et al., 2013).

The aim of this study was to assess possible changes in the use of psychiatric services and pattern of care derived retrospectively from an administrative database, in patients with schizophrenia previously included in a study of effectiveness of different modalities of CR vs treatment as usual (TAU) (Vita et al., 2011b), in relation to the treatment received.

### 2. Materials and methods

#### 2.1. Patients and methods

The patients recruited for this study participated in a previously published study (Vita et al., 2011b), which included 84 patients with schizophrenia (DSM-IV-TR; American Psychiatric Association, 2000), aged 18–50 years, followed at the Departments of Mental Health of the Spedali Civili Hospital, Brescia and of the Istituti Ospitalieri Hospital, Cremona (Italy). Exclusion criteria were (a) a concomitant diagnosis of mental retardation (as revealed by a WAIS-R (Wechsler, 1981)) total IQ < 70 or substance use disorder; (b) severe positive symptoms or impulsive behaviour requiring a higher security setting; (c) significant changes in psychopathologic status (requiring hospitalization or major changes in pharmacologic treatment) in the last 3 months. These are the same criteria for exclusion of patients to the rehabilitative centres where the study was conducted. To summarize, patients consecutively admitted to the rehabilitative facilities of the participating departments were recruited and randomly assigned to a CR or TAU intervention. More details on patients' recruitment and treatment allocation and delivery are given in the original paper (Vita et al.,

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2011b). Fifty-six patients received a CR intervention for 6 months in addition to standard care; in particular, 26 patients received a group-based CR intervention, i.e. the first two subprograms of the Integrated Psychological Therapy (IPT-Cog) (Brenner et al., 1994), and 30 patients received a computer assisted intervention (CACR), using the Cogpack software ([www.markersoftware.com](http://www.markersoftware.com)). Another group of patients ( $n = 28$ ) received a non-cognitive oriented rehabilitation intervention, with the same frequency and duration as the cognitive remediation interventions (TAU), in addition to standard care. Standard care and non-cognitive oriented interventions included individual and group based activities, usually delivered in study centres, namely art therapy (e.g., theater, music, sculpture, reading and movie groups), physical training (e.g., diving, horse riding, mountain walks, gym), or occupational therapies (e.g., gardening, cooking). These activities are not structured as they do not follow a manual, and benefit from the participation of rehabilitation professionals, as long as experts (artists, actors, musicians, sport teachers, etc.). All patients received antipsychotic medication.

To evaluate the use of psychiatric services before and after the CR or TAU interventions, data were gathered from the Psychiatric Information Computerised System promoted by the Lombardia Regional Health Authority (PSICHE). This is an administrative database, updated every day, which collects data regarding all the interventions received by the patients and performed by different health professionals in all settings of care of the Lombardia psychiatric services (Fattore et al., 2000). The database collects objective information of the clinical activities delivered by the psychiatric services on patients in a given time period and therefore is not affected by the subjective role of observers or by reliability and validity of rating scales. Variables collected from PSICHE and used for the analyses were: number and duration (days) of hospitalizations in acute psychiatric units; number and duration (days) of stays in rehabilitative residential facilities; total number of outpatient interventions (corresponding to the sum of medical and psychological visits and any psychosocial intervention); number of rehabilitative interventions (individual and group based, with the exclusion of cognitive-oriented rehabilitation, either delivered in outpatient services or residential rehabilitation facilities or day centres). To define different patterns of rehabilitation, a rehabilitative index, based on the number, intensity, duration, and differentiation of interventions was calculated and two groups were identified. In the “simple rehabilitation” group, we included patients who received either less than one intervention per week in any rehabilitation area, or any number of interventions per week in no more than one area of rehabilitation during the observation period. The “advanced rehabilitation” group included patients who received one or more interventions per week in at least two areas of rehabilitation. The activities could be individual or group-based, either structured evidence-based interventions (social skills training, psychoeducation, supported employment) with the exclusion of cognitive-oriented rehabilitation, or resocializing/rehabilitative interventions described above as TAU, and involving areas relative to self-care, occupational, physical/psychomotor, or expressive activities. This grouping allowed us to satisfactorily separate patients receiving constant, intensive and articulated rehabilitation from those receiving simpler and less intensive rehabilitation.

Data collected in the 12 months before the administration of CR or TAU interventions and those collected in the 12 months after completion of such interventions were analysed.

## 2.2. Statistical analyses

Given the non-normal distribution of the service use variables (Kolmogorov-Smirnov tests significant at  $P < 0.05$  for all variables), data were analysed with non-parametric statistics. To detect within-group changes in psychiatric service use in the periods before and after treatments, a pairwise Wilcoxon signed rank test was used. To investigate

possible differences between the CR and TAU groups, in the year before and the year after treatment, Mann-Whitney  $U$  tests were applied.

Between-group differences in patterns of rehabilitation (simple vs advanced) before and after treatment were investigated using chi-squared tests.

The change of use of psychiatric services (use of services after treatments minus before treatment) was compared between the CR and TAU groups using Mann-Whitney  $U$  test.

Finally, as additional (post hoc) analysis, within-group change of psychiatric service use in each of the groups who completed specific CR interventions (IPT-Cog or CACR) were investigated using pairwise Wilcoxon signed rank test. Data analyses were performed with SPSS 14.0.

## 3. Results

The demographic characteristics of the original sample at the beginning of the CR and TAU interventions are described in Table 1. Psychiatric service use data before or after the completion of the CR or TAU interventions were unavailable or incomplete for 3 patients, so 81 patients were included in the analyses. No between-group demographic differences emerged, except for age ( $t$ -test  $P < 0.01$ ). To analyze the possible effect of age on the variables under analysis, a non-parametric correlation was performed between age and psychiatric service use, which was found to be not significant for all the variables investigated. Since the outcome variables considered could be associated, we performed simple correlations (Spearman's rho) between all the outcome variables in the 12 months after treatment. All these correlations were not significant.

### 3.1. Use of psychiatric services before and after treatments

No differences in psychiatric service use between periods before and after TAU emerged. Conversely, in patients receiving CR, a reduction in the number and duration of acute hospitalizations and the number of admissions in rehabilitative centres, and an increase in the total number of outpatient interventions and rehabilitative interventions emerged (Table 2).

### 3.2. Between-group (CR vs TAU) comparison of use of psychiatric services

In the 12 months before the treatments, no differences in psychiatric service use between the CR and TAU groups emerged.

During the 12 months after the interventions, a lower number and shorter duration of hospitalizations in acute psychiatric wards were detected in the CR group compared with the TAU group (Table 2). In this 1-year period, the patients in the CR group also received a higher number of total outpatient interventions, as well as a higher number of rehabilitation interventions (Table 2).

### 3.3. Between-group (CR vs TAU) comparison of different patterns of rehabilitation (simple vs advanced rehabilitation)

No between-groups differences in the frequency of different patterns of rehabilitation emerged in the 12 months before the CR or TAU interventions. In the 12 months after completion of the interventions, 78% of patients in the CR group versus only 41% of patients in the TAU group had access to an advanced rehabilitation (chi-squared 10.9;  $P < 0.001$ ) (Table 3).

### 3.4. Change of psychiatric services use: comparison between CR and TAU group

Significant differences in the change (post minus before treatment) of psychiatric service use between the CR and TAU groups emerged for the number of total and rehabilitative interventions ( $P < 0.05$ ),

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