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Research paper

Group cognitive remediation therapy for chronic schizophrenia: A randomized controlled trial

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HIGHLIGHTS

- CRT significantly improved cognitive flexibility, memory and social function.
- Improvement of cognitive function did not predict social function change.
- CRT is an effective and promising therapy for patients with schizophrenia in china.

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ABSTRACT

Individual-level cognitive remediation therapy (CRT) has been shown to be effective for cognitive improvement and social function amelioration. Here, we aimed to test the efficacy of group-based CRT in Chinese subjects with schizophrenia. One-hundred and four inpatients were randomly assigned to either 40 sessions of small-group CRT therapy or therapeutic contact-matched Musical and Dancing Therapy (MDT). Cognitive and social functioning, as well as clinical symptoms, were evaluated over the course of treatment. Specifically, cognitive function was evaluated using a battery of cognitive measurements, clinical symptoms were evaluated using the Positive and Negative Syndrome Scale, and social function was evaluated using the Nurse's Observation Scale for Inpatient Evaluation-30. All patients were evaluated pre- and post-treatment. Forty-four individuals in the CRT group and 46 in the MDT group completed all of the planned treatments and analyses. Cognitive functions, especially cognitive flexibility and memory, showed significant improvement in the CRT group over the course of the study. The MDT group also showed improvement in several cognitive flexibility assessments, but the degree of improvement was significantly greater in the CRT group. Several social-function factors exhibited a significant improvement in the CRT group, but not in the MDT group. Cognitive function improvement correlated positively with social function without predicting social function change. We conclude that group-based CRT is an effective and promising therapy.

1. Introduction

Cognitive impairment is a core feature of schizophrenia [4,16], and deficits affecting processing speed, attention/vigilance, working memory, and executive function correlate with poor functional outcomes [3,19,29]. Antipsychotic agents significantly control clinical symptoms, especially positive symptoms. However, these agents, whether typical or atypical, produce little or no remediation of cognitive deficits in schizophrenia [6,15,31]. Because of this shortcoming, many non-drug therapies, most notably neurocognitive approaches such as cognitive remediation therapy (CRT), have been developed [12,32,35]. CRT is a novel rehabilitation method that aims to teach patients "thinking" skills in order to produce improvement in cognitive processes such as attention, working memory, and executive function [9,21,33,35]. Accumulating evidences have validated the efficacy of CRT [10,22,33,34]. Moreover, most studies have found significant functional outcome improvements accompanying changes in the level of cognitive functioning

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[8,28,37]. Prior studies confirming the efficacy of CRT [20,24,30] have almost entirely used individual-level CRT (i.e., one therapist and one participant per session). Although increasing evidence indicates a face-to-face approach is effective in improving cognition and social function in schizophrenia [26,35], it is difficult to transfer this method to routine clinical therapy due to an insufficient supply of therapists. To remove this translational bottleneck, a group-based variation of CRT appears promising, especially in China, home to about 10 million patients with schizophrenia [25] who all might benefit from CRT. However, to date, evidence on the clinical effects of group-based CRT for this disorder is limited. The present study was therefore undertaken.

2. Methods

2.1. Participants

All participants were recruited from the Beijing Huilongguan Hospital. The inclusion criteria were:

- Diagnosis of schizophrenia according to the Diagnostic and Statistical Manual, 4th ed. [1] by two attending psychiatrists;
- duration of illness of 2 years or more;
- age 20–60 years;
- evidence of cognitive impairment;
- completion of at least 6 full years of education;
- clinical condition stable for at least 1 month.

Participants were excluded for:

- Difficulty in communicating effectively with therapists;
- substance abuse, as defined by the DSM-IV;
- history of organic brain disorder or other severe organic disorder.

All participants provided written informed consent, and the protocol was approved by the Beijing Huilongguan Hospital Ethics Committee.

2.2. Procedure

One hundred and four participants fulfilled all criteria and were randomly assigned to the CRT ($n = 52$) or the Music and Dance Therapy (MDT) groups ($n = 52$). A random number table was used to generate lots that were drawn for sealed envelopes, which assigned the participants to the CRT or MDT groups (see consort flow chart in Fig. 1).

All participants were assessed before and after 10 weeks of treatment. Neurocognitive function, clinical symptoms, and social functioning were evaluated. Neurocognitive tests were carried out by two clinical psychologists, who had at least 5 years' experience with psychometric testing. Clinical symptom rating (Positive and Negative Syndrome Scale, PANSS) was conducted by two attending psychiatrists. Social function assessment was carried out by four senior nurses, who had at least 5 years' experience in psychiatric nursing. All eight raters were blind to group assignment.

2.3. Measures

The following measures were administered:

2.3.1. Clinical assessment

The Chinese version of the PANSS [39] was used for symptom assessment. In addition to the total score, three subscales were calculated: positive, negative, and general psychopathology.

2.3.2. Neurocognitive assessment

(i) Stroop neuropsychological screening test: This is a paper version of the ubiquitous Stroop test, key measurables being the reaction times for correctly naming 30 items in the following three categories: the color of colored circles printed in red, yellow, blue, or green; the word information of words printed in the same four colors; and the color information of words printed in the same four colors. The words were color names that were different from the color of the ink in which the word was printed. Two skilled clinical psychologists used a professional stopwatch to measure the reaction times.

(ii) Category fluency test (CFT): Participants were asked to provide as many different names of fruits or animals as possible in one minute, the score being the number of such names provided.

(iii) Verbal fluency test (VFT): Participants were asked to provide as many different Chinese common words as possible in one minute consisting of two to four Chinese characters beginning with a cue character provided by the test giver. For example, if the latter were "工 ", which means "working," participants could use it to make a word such as "工人 ", or "worker." In each test, five cue characters were given sequentially and the score was the total number of valid words generated.

(iv) Trail making test-A: The key measurable was the time required to draw a trail in numerical order through a set of numbers running from 1 to 25, where the numbers were randomly placed. Time required to perform Trail making test-A was also recorded using a professional stopwatch.

(v) Logical memory test: Wechsler Memory Scale-Revised: Immediate-recall total score and delayed-recall total score.

(vi) Benton visual retention test (BVRT) [7], Form C: Participants were asked to reproduce 10 simple geometric designs in turn from memory. The key measurables were numbers of right and wrong responses.

(vii) Digit span (Wechsler Adult Intelligence Scale-Revised): Administered according to the standard WAIS-R instructions. The key measurable was the age-scaled score.

2.3.3. Social functioning assessment

A Chinese version [18] of the Nurse's Observation Scale for Inpatient Evaluation (NOSIE)-30 [14] was used to evaluate participant behavior and social functioning. The measurables comprised a total score, a positive-factor score, and a negative-factor score.

2.4. Therapy

The CRT protocol was based on a Chinese version of the CRT manual, originally derived from an English version of Frontal/Executive Function Program (Revised) [5,34]. This therapy consists of three modules: (1) the "Cognitive Shift Module," addressing flexibility in thinking and information-set maintenance; (2) the "Working Memory Module", addressing working memory capacity, which has participants work with two to five information sets at a time; and (3) the "Planning Module," which training the ability for self-ordered, goal-oriented, set/schema formation, manipulation, and planning [23,38].

Participants received 40 hourly sessions at an average rate of 4 per week. Four therapists, after standard CRT therapy training, helped the participants finish the CRT tasks, which were mainly done with pencil and paper. Each therapist conducted testing of 3–4 participants simultaneously with the details of the process varying with individual performance in treatment. To minimize errors, the therapist also discussed information-processing strategies and how to regulate, organize, and monitor behavior. As described in other reports [12,33], many therapeutic techniques such as error-