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Review article

A review of the Chinese literature on cognitive remediation in psychosis

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ABSTRACT

Accumulating data have shown that cognitive remediation therapy (CRT) has moderate to strong effects on improving cognitive function in patients with psychosis, especially in schizophrenia. In recent years, a number of studies about CRT or computerized CRT (CCRT) have been published; unfortunately, since most of them are written in Chinese, they are not accessible to non-Chinese readers. This review aims to introduce and discuss the research and clinical practice of CRT and CCRT in China. The present review includes eight original papers, six published in Chinese journals and two in English journals. Six papers investigated the clinical effect of CRT or CCRT utilizing a randomized controlled study design. The other two papers explored brain function or structural change after CRT or CCRT treatment. All eight papers reported some beneficial effects of CRT and CCRT on cognitive functions, with three of them showing benefits on social functions. One functional magnetic resonance imaging (fMRI) study showed some change of neural activation in the dorsolateral prefrontal cortex after CRT therapy. In addition to reviewing the published literature, we also discuss the current state of clinical practice of CRT and CCRT in China.

Contents

Abbreviations: BPRS, Brief Psychiatric Rating Scale; BACS, brief assessment of cognition in schizophrenia; CCRT, computerized cognitive remediation therapy; CET, Cognitive enhancement therapy; CPT, Continuous Performance Test; CRT, cognitive remediation therapy; DLPFC, dorsolateral prefrontal cortex; DS, digit span test; DTI, Diffusion Tensor Imaging; FA, fractional anisotropy; fMRI, functional magnetic resonance imaging; HVLT, Hopkins verbal learning test; NOSIE, Nurse's Observations Scale for Inpatient Evaluation; ORT, occupational and recreational therapy; PANSS, Positive and Negative Syndrome Scale; SDSS, Social Disability Screening Schedule; SSSI, Scale of Social Skills of chronic schizophrenia Inpatients; TAU, adopted treatment as usual; TMT, trial making test; TOL, Tower of London test; WCST, Wisconsin Card Sort Testing; VFT, verbal fluency test.

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1. Introduction

Cognitive deficit is one of the most common syndromes in patients with mental illness, especially in patients with psychoses, such as schizophrenia. To date, there is insufficient evidence to support the pharmacological treatment of cognitive impairment in patients with psychosis (Choi et al., 2013). Therefore, finding an effective method to improve cognitive functioning in patients with psychosis is a critical task in the field of clinical psychiatry. Since the 1990s, cognitive remediation therapy (CRT) has emerged as a promising method of treating the cognitive deficits experienced by psychotic patients. An accumulating body of data has shown that CRT has a moderate to strong effect on improving cognitive function in patients with psychosis, especially those with schizophrenia. As a behavior training method aims to improve cognitive processing (attention, memory, executive function, and social cognition) with durability and generalization, CRT and computerized cognitive remediation therapy (CCRT) have been proven by a series of meta-analyses to have clinical effects not only on cognitive function (working memory, verbal learning and memory, problem solving and social cognition et al.) but also on functioning (Wykes et al., 2011). To date, most of the published articles on CRT and CCRT have been from the Western countries, such as the UK, USA, Germany, and Spain (Kurtz et al., 2007; Wykes et al., 2007; Subramaniam et al., 2012; Garrido et al., 2013). The supporting evidence for CRT or CCRT in the eastern literature is quite limited. In recent years, an increasing number of papers about CRT or CCRT have been published in Chinese. However, these works are not accessible to non-Chinese readers.

Thus, there is a communication barrier in the explorations of CRT and CCRT between China and the West. This manuscript presents the developing status of CRT and CCRT in China through a comprehensive review of the research published in Chinese journals, as well as a description of the use of these techniques in clinical practice.

2. Material and methods

2.1. Research of CRT in China

To obtain an outline of the research into CRT and CCRT in mainland China, we used PubMed (search papers published in English), and the top 3 Chinese journal databases, including Wanfangdata (http://www.wanfangdata.com.cn), CNKI (http://www.cnki.net), and CQVIP (http://www.cqvip.com). Using CRT, CCRT, cognitive training, cognitive rehabilitation, cognitive enhancement and psychosis or schizophrenia as key words, a total number of 13 published papers were obtained from these databases. Excluding 5 papers that were published merely as a general introduction of CRT or CCRT; eight papers (2 in English and 6 in Chinese) were identified for use in the present paper.

These eight works come from five different places in China. Three focus on the work performed in Beijing Huilongguan Hospital, which was the first place to perform CRT research in 2003, and from which the first published research data on CRT (in the *Chinese Journal of Psychiatry* in 2007) was obtained. Two of them came from the Seventh People's Hospital of Hangzhou in Zhejiang Province. The three remaining papers include data from Hebei Medical University, the Third People's Hospital of Lanzhou in the Gansu Province, and Suzhou Guangji Hospital in Jiangshu Province.

2.2. Methodological issues

Six of these papers focused on the clinical effects of CRT or CCRT in randomized controlled studies. The remaining two papers paid more attention to brain function or structural changes after CRT or CCRT treatment, but there was only one treatment group, with no control group in either study. The mean sample size for all eight papers was 78, ranging from 10 to 153. The participants recruited for these studies were patients with chronic schizophrenia who were in a stable clinical condition, with a mean duration of illness of 18 years (range: 8–24 years), mean age 39 years (range: 32–47 years). Participants in seven studies have been reported receiving antipsychotic agents except one research. (Kaiyuan, 2014). Seven published works included inpatients with schizophrenia, while only one dealt with outpatients. Three studies used CCRT (Lin, 2012; Kaiyuan, 2014; Jian et al., 2015), four adopted CRT (Shu-ping et al., 2007; Yi-min et al., 2011; Lv et al., 2012; Tan et al., 2016), and one used both CRT and CCRT to treat patients with schizophrenia (Shu-ping et al., 2010) (See Table 1).

The CRT therapy used in these studies was a Chinese version of the therapy presented in the CRT manual, which was adapted and derived from an English version of the Frontal/Executive Function Program (Revised) (Delahunty and Morice, 1996; Wykes et al., 1999). The CRT adopted in these studies consisted of three modules: the "Cognitive Shift Module," which addresses flexibility in thinking and information maintenance; the "Working Memory Module," which focuses on improving working memory capacity; and the "Planning Module," which aims to train and improve an individual's ability to complete self-ordered, goal-oriented, set/schema formation, manipulation, and planning (Penades et al., 2006; Wykes and Spaulding, 2011). The CCRT treatment used in these studies consisted of software with different cognitive training task styles, focusing on cognitive flexibility, processing speed, attention, working memory, planning, et al (Jian et al., 2015). The cognitive domains of CRT and CCRT training are similar. Most of them can be categorized as one of the MATRICS consensus domains: working memory, speed of processing, attention, verbal learning, visual learning, reasoning, and problem solving (Nuechterlein et al., 2008), except for social function.

Among the six studies using randomized controlled protocol, five reported using occupational and recreational therapy (ORT), plus antipsychotic agents as the control condition, and one adopted treatment as usual (TAU), with no other treatment method except for antipsychotic medicine as the control group. During ORT treatment, patients often undertake some recreational activity, such as learning to play a fairly easy instrument (namely, the xylophone) or learning to dance (Tan et al., 2016). The duration and frequency of therapeutic exposure in the ORT group were identical to those of the CRT group.

All of these cognitive outcomes at posttreatment refined into the Measurement and Treatment Research to Improve Cognition in Schizophrenia (Nuechterlein et al., 2008) group domains. Effect sizes of cognitive outcomes were calculated by using pre-post difference scores and pooled standard deviations. Global effect sizes in each study were derived by averaging the available effect sizes of individual measures. To get effect sizes of each cognitive domains and global cognition refined by MATRICS, meta-analyses