Updates In Cognitive Impairment In Schizophrenia

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By

Ahmed Mohamed Ali Daabis

M.B.B.Ch

Under the supervision Of

Prof. Nahla El Sayed Nagy

Professor of Psychiatry
Faculty of Medicine
Ain Shams University

Prof. Nivert Zaki Hashim

Professor of Psychiatry
Faculty of Medicine
Ain Shams University

Dr. Mahmoud Mamdouh El Habiby

Lecturer of Psychiatry
Faculty of Medicine
Ain Shams University

Faculty of Medicine
Ain Shams University
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Ahmed Daabis

List of Contents

List of Tables

List of Figures

List of Abbreviations

Abb.	Meaning
31P-MRS	Phosphorus magnetic resonance spectroscopy
AD	Alzheimer's disease
AD+P	Psychotic symptoms in Alzheimer disease
AI	Primary Auditory Cortex
APA	American Psychiatric Association
AV	Attention/Vigilance
BACS	Brief Assessment of Cognition in Schizophrenia
BPD	Borderline Personality Disorder
BVMT-R	Brief Visuospatial Memory Test—Revised
CATIE	The Clinical Antipsychotic Trials of Intervention Effectiveness
CIAS	Cognitive impairment associated with schizophrenia
CPT	Continuous Performance Test
CPT-IP	Continuous Performance Test-Identical Pairs
D2	Dopamine Receptor 2
DA	Dopamine
DLPFC	The Dorsolateral Prefrontal Cortex
DS-CPT	Degraded Stimulus-Continuous Performance Test
DSM	Diagnostic and Statistical Manual of mental disorders
DTI	Diffusion Tensor Imaging
EEG	Electroencephalograms
EUFEST	The European Union First Episode Schizophrenia Trial
FA	Fractional anisotropy
fMRI	Functional Magnetic Resonance Imaging
GABA	Gamma Aminobutyric Acid
HG	Heschl's gyrus
HVLT-R	Hopkins Verbal Learning Test—Revised

K-AVLT	Korean version of Auditory Verbal Learning Test
K-CFT	Korean version of Complex Figure Test
K-WAIS	Korean version of Wechsler Adult Inelegance Scale
LLS	late-life schizophrenia
MATRICS	The Measurement and Treatment Research to Improve Cognition in Schizophrenia
MCCB	The MATRICS Consensus Cognitive Battery
MD	Mean diffusivity
MSCEIT	Mayer-Salovey-Caruso Emotional Intelligence Test
MTI	Magnetization Transfer Imaging
MTR	Magnetization Transfer Ratio
NAB	Neuropsychological Assessment Battery
NIMH	The National Institute of Mental Health
NMDA	N-Methyl-D-Aspartate
OC	obsessive-compulsive
OCD	obsessive-compulsive disorder
PET	Positron emission tomography
RAVLT	Rey Auditory Verbal Learning Test
ROI	region of interest
RP	Reasoning/Problem solving
sMRI	Structural Magnetic Resonance Imaging
SP	Speed of processing
VBA	voxel-based analysis
VM	Verbal learning and memory
VSM	Visual learning and memory
WAIS-R	Wechsler Adult Inelegance Scale-Revised
WM	Working memory
WMS-III	Wechsler Memory Scale—3rd Ed.

INTRODUCTION

The DSM -5 describes Schizophrenia in terms of a severe, chronic, and potentially disabling thought disorder **(American Psychiatric Association 2013)**. The prevalence of schizophrenia is about one percent of the general population **(APA 2013)**. It is the most common chronic psychosis in Egypt **(Okasha et al., 1993)**.

It has a robust genetic component, tends to appear during young adulthood, and is typically marked by periods of remission and relapse throughout the lifespan. Lack of medication compliance is a primary reason for relapse **(Battaglia 2014)**. It most commonly manifests itself as auditory hallucinations, paranoid delusions, or disorganized speech and thinking, and it is accompanied by significant social or occupational dysfunction. The onset of symptoms typically occurs in young adulthood **(Van Os. and Kapur 2009)**. Diagnosis is based on observed behavior and the patient's reported experiences.

Despite the etymology of the term from the Greek roots skhizein (to split) and phrēn (mind), schizophrenia does not imply a "split personality", or "multiple personality disorder" (which is known these days as dissociative identity disorder) a condition with which it is often confused in public perception **(Picchioni**

and Murray 2007). Rather, the term means a "splitting of mental functions", because of the symptomatic presentation of the illness.

The disorder is thought mainly to affect cognition, but it also usually contributes to chronic problems with behavior and emotion. People with schizophrenia are likely to have additional (comorbid) conditions, including major depression and anxiety disorders; the lifetime occurrence of substance abuse is almost 50% **(Buckley et al., 2009)**. Social problems, such as long-term unemployment, poverty and homelessness, are common. The average life expectancy of people with the disorder is 12 to 15 years less than those without, the result of increased physical health problems and a higher suicide rate (about 5%) **(Van Os. and Kapur 2009)**. The larger literature examining the association between severity of cognitive deficits and psychopathologic symptoms is consistent in showing a significant but modest association between severity of cognitive deficits and negative symptoms, but no association between cognitive deficits and positive symptoms, such as hallucinations and delusions **(de Gracia et al., 2009)**.

Cognitive performance deficits in schizophrenia have been identified in almost every measurable cognitive ability domain, from basic sensory and perceptual functions through preconscious information processing and early attention to higher order

cognition, including selective and sustained attention, working memory, episodic memory in verbal and nonverbal domains, processing speed, and problem solving **(Heinrichs et al., 1998; Dickinson et al., 2007).**

Cognitive performance deficits are seen in high-risk groups prior to the onset of psychotic illness **(Erlenmeyer-Kimling et al., 2000).**

Deficits are broadly evident and well established at first episode and remain fairly stable through middle age **(Albus et al., 2002; Hughes et al., 2003)**, but there is evidence of exacerbation of deficits in later life **(Friedman et al., 2001),** perhaps due to the duration of initially untreated psychosis **(Waddington et al., 1995).**

Studies using neuropsychological tests and brain imaging technologies such as fMRI and PET to examine functional differences in brain activity have shown that differences seem to most occur in the frontal lobes, hippocampus and temporal lobes **(Kircher et al., 2006).**these differences have been linked to the neurocognitive deficits often associated with schizophrenia **(Green 2006).**

There are also frequent abnormalities in the size or shape of the corpus callosum **(Price et al., 2007; Walterfang et al., 2008),** supporting the view of schizophrenia as a disconnection syndrome **(Friston and Frith 1995)** and, as with earlier CT

findings, there are enlarged ventricles **(DeLisi 2008; Shenton et al., 2001).** Functional imaging studies have found lower activity in the prefrontal cortex and abnormal activation in the temporal lobes during performance of both verbal and visual tasks **(Eyler et al., 2004, 2008; Keshavan et al., 2008).**

The white matter findings of **Wexler et al. (2009),** suggested abnormalities of functional connectivity in participants with schizophrenia and cognitive impairment, but not in healthy controls or participants with schizophrenia and no cognitive impairment.

Because these cognitive deficits have been linked to poor functional outcome **(Green et al., 1996; Niendam et al., 2006),** there is considerable interest in developing treatments for cognitive impairments.

Until recently, antipsychotic drug development in schizophrenia has focused mainly on developing drugs that reduce the positive symptoms of schizophrenia **(Miyamoto et al., 2005).** In a recent meta-analysis, patients treated with typical antipsychotics were actually shown to have small but detectable improvements in several cognitive domains **(Mishara et al., 2004);** In addition, there is some evidence for the superiority of atypical antipsychotics, such as olanzapine and risperidone, over typicals in improving cognitive performance **(Bilder et al., 2002 ; Purdon et al.,2000).**

In recent years, there has been an increasing recognition of the need for psychosocial rehabilitative interventions for schizophrenia **(Insel 2009).** In that regard, recent efforts to develop cognitive training programs for schizophrenia offer promise **(Twamley et al., 2003; Velligan et al. 2006).**

AIM OF THE WORK

1- Clarification of domains of cognitive impairment in schizophrenia.

2- Focusing on neuropathology of cognitive impairment associated with symptoms of schizophrenia.

3- Differential diagnosis from cognitive dysfunction in other psychiatric disorders.

4- Highlighting methods of assessment of cognition in schizophrenia.

5- Focusing on special considerations in treatment of cognitive impairment in schizophrenia.