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Review

Cognition in at-risk mental states for psychosis

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ABSTRACT

Rationale: The devastating nature of schizophrenia and treatment limitations have triggered a search for early detection methods to enable interventions to be implemented as soon as the first signs and symptoms appear. In this effort, several studies have investigated the cognitive functions in individuals regarded as being in at-risk mental states (ARMS) for psychosis.

Objective: Our aim was to make a systematic review of the literature regarding basic and social cognition in individuals in ARMS following the guidelines of the PRISMA statement.

Results: In general, the results of the 49 articles included in the review show that individuals in ARMS have pervasive cognitive deficits that seem to be greater in individuals who later convert to psychosis.

Conclusions: Cognitive impairment can be detected in individuals considered to be in ARMS according to current classifications and may serve as a risk marker for psychotic conversion; however, the lack of standardized criteria to define ARMS and of homogeneous cognitive assessment methods hamper the generalization of findings from different studies.

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1. Introduction

Schizophrenia is a severe psychiatric disorder characterized by the presence of positive (hallucinations, delusions), negative (apathy, anhedonia, social withdrawal, etc.), and cognitive symptoms.

In respect to cognition, research has shown that the most affected domains are memory, attention, executive functions, language, and intelligence (Fioravanti et al., 2012). Similar impairments are also found in social cognition, affecting the capacity to recognize facial expressions of emotion (Marwick and Hall, 2008; Kohler et al., 2010) and to infer the mental state of others (Brüne, 2005; Sprong et al., 2007), abilities that are central to successful interpersonal relationships (Adolphs, 1999; Frith and Frith, 2007). Evidence suggests that these deficits would be a core feature of schizophrenia directly related to the decline in social functioning seen in patients (Addington and Addington, 1999; Couture et al., 2006; Jabben et al., 2010).

Despite significant progress in the comprehension of the pathological mechanisms underlying schizophrenia, the full picture of its etiology remains elusive. Current pharmacological treatments have important limitations, since although the drugs available have partial success in the control of positive symptoms, little is achieved in what regards negative and cognitive symptoms (Keefe et al., 2007).

The first signs and symptoms of schizophrenia usually appear between the end of adolescence and beginning of early adulthood, with a later onset in women (África and Schwartz, 1995). The disorder has a chronic course with successive psychotic episodes that generally lead to deterioration in cognitive and social functioning (Andreasen, 2000; África and Schwartz, 1995; Mueser and McGurk, 2004; Schultz and Andreasen, 1999) and treatment resistance tends to appear over time. Together, these characteristics point to possible degenerative processes, which would also be associated with progressive cognitive decline (Pukrop et al., 2006).

Because of the suffering of patients and their relatives and the huge social and economic burden of schizophrenia (Wu et al., 2005), the recognition and early treatment of the disorder are a highly relevant focus of research, and it seems plausible that pharmacological and non-pharmacological interventions implemented soon after the appearance of the first signs and symptoms could minimize cognitive deficits and symptom severity and even prevent the onset of frank psychosis, hence improving the social functioning and quality of life of affected individuals.

As a result of the burden described, several research groups around the globe have been working to develop methods for the early detection of psychosis (Gross et al., 1987; Hafner et al., 2004; Klosterkötter et al., 2001; McGlashan et al., 2001; Miller et al., 2003; Yung and McGorry, 1996) and proposed a number of instruments and classifications for the assessment and definition of at-risk mental states.

The Personal Assessment and Crisis Evaluation clinic (PACE; Yung and McGorry, 1996) in Australia was the first service specifically focused on the treatment and study of individuals considered to be at risk for psychosis. PACE uses the classification of “ultra-high-risk” (UHR) for psychosis and created an instrument called Comprehensive Assessment of At-Risk Mental States (CAARMS; Yung et al., 2005) with the specific purpose of detecting psychosis early.

The CAARMS is a semi-structured clinical interview consisting of three groups of criteria to screen for signs and symptoms of psychosis. Individuals that fulfill the criteria of one or more of the

groups are classified as being at risk of developing psychotic disorders. Group 1 is called “attenuated psychotic symptoms”, group 2 is called “brief Limited Intermittent Psychotic Symptoms and group 3 is called “trait and state risk factors”.

The observation that the severity of cognitive impairment is directly associated with the social functioning level of schizophrenia patients suggests that cognition could act as a physiopathological marker of the disorder. This view is supported by reports that cognitive impairments may be present even before the occurrence of a full-blown psychotic episode, although in attenuated form (Lencz et al., 2006).

Knowledge about the severity and specificities of cognitive impairments could enable the construction of more accurate algorithms to predict conversion to psychosis, in addition to providing new targets for treatment and prevention strategies. The investigation of cognitive functioning in ARMS individuals could also provide important data regarding vulnerability factors in psychosis and thus contribute to elucidate the physiopathological mechanisms of schizophrenia.

Here, we made a systematic review of the literature available regarding basic and social cognition in individuals considered to be at risk for the development of psychosis. Specifically, we describe and discuss the methods used for the assessment of cognitive function in ARMS individuals and the relationship between cognitive impairment, rates of conversion to psychosis, and severity of psychotic disorders.

2. Methods

2.1. Article search and selection

The following combinations of search terms were used to seek for relevant articles to the subject of this review: cognit*, prodrome, (psychosis or schizophrenia); cognit*, ultra high risk, (psychosis or schizophrenia) and cognit*, “early psychosis”. The databases searched were PubMed, PsycINFO, LILACS and SciELO.

We included articles that assessed basic and/or social cognitive functions in ARMS individuals, written in Portuguese, English, Spanish or French and published until June 3, 2013. Articles describing studies that involved only groups of subjects with confirmed diagnoses of psychotic disorders, review articles, letters to the editor, case reports and pharmacological trials were not included in the review.

3. Results

3.1. Selected articles

A search in the PubMed yielded 300 matches, 38 of which fulfilled our inclusion criteria. The search engine PsycINFO returned 292 references, of which three were selected. One article was found via SciELO, which found 8 matches, and the search in the LILACS database returned no matches for the search terms used.

Forty-two articles were selected through the databases searched and another seven were included from the reference lists of the former, adding to the total of 49 articles reviewed after the application of the inclusion and exclusion criteria.

The articles included were published between 2002 and 2013 and described studies performed in the United States ($n = 12$),

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