Journal of Psychiatric Research 70 (2015) 106–112

Contents lists available at ScienceDirect

Journal of Psychiatric Research

journal homepage: www.elsevier.com/locate/psychires

Comparing cognitive functions in medication adherent and non-adherent patients with schizophrenia

Ahmed El-Missiry*, Amira Elbatrawy, Marwa El Missiry, Dalia Abdel Moneim, Ramy Ali, Heba Essawy

Institute of Psychiatry, The WHO Collaborating Center for Mental Health Research & Training, Ain Shams University, Department of Neuropsychiatry, Abbasseyia, Ramses Street Extension, P.O. Box: 11657 Dair Al-Malak, Cairo, Egypt

ARTICLE INFO

Article history:
Received 30 April 2015
Received in revised form
19 August 2015
Accepted 11 September 2015

Keywords:
Schizophrenia
Adherence
Cognitive functions
Memory

ABSTRACT

Background: Medication non-adherence presents a considerable problem in patients with schizophrenia. Cognitive and executive functions can affect adherence. The association between medication non-adherence and cognitive impairment in schizophrenia is under investigated with limited and conflicting research data.

Purpose of the study: To prospectively assess the rate of drug adherence among a sample of patients with schizophrenia and to compare the cognitive and executive functions between adherent and non-adherent patients.

Subjects and methods: 109 patients with schizophrenia diagnosed according to the DSM-IV classification were initially assessed by the Wechsler Adult Intelligence Scale (WAIS), Wechsler Memory Scale-Revised (WMS-R) and Wisconsin Card Sorting Test (WCST) and six months later by the Brief Adherence Rating Scale (BARS).

Results: 68.8% were non-adherent to their antipsychotic medication. Adherent patients (31.2%) had significantly higher mean scores for the total, verbal and performance IQ. They had significantly higher mean scores in most of WMS subtests (orientation, information, verbal paired association, digit span, visual memory span), and higher mean scores for; total correct, conceptual level response, percentage and categories completed on the WSCT subscales ($P < 0.0001$). Whereas the non-adherent group had higher mean scores in; trials administered, total errors, perseverative responses, and perseverative errors ($P < 0.0001$). In a step regression analysis, digit span, conceptualization, total and percentage of errors were putative predictors of non-adherence.

Conclusion: Cognitive deficits, especially verbal memory and executive functions were the strongest patients' related factors associated with non adherence to medication. Psychiatrists ought to consider possible cognitive factors influencing adherence to enable offering proper interventions.

1. Introduction

Medication Adherence is defined as "the extent to which the patient's behaviour matches the agreed recommendations of the prescriber" (World Health Organization, 2003). While adherence is poor across a wide variety of physical and psychiatric conditions, the consequences of poor medication adherence can be devastating in schizophrenia, where the personal and societal costs of relapse are very high (Kirk Morton and Zubek, 2013). The consequences of medication non adherence can be detrimental for patients and their families in terms of personal suffering, poor functional outcome (Barkhof et al., 2012), higher relapse rate (Janssen et al., 2006), more health care utilization (Sun et al., 2007), increased rate of hospital admission (Knapp and Locklear, 2009) and poor quality of life (Dibonaventura et al., 2012).

Despite the development of new antipsychotics with broader efficacy and improved side effect profiles; nevertheless, the levels of medication adherence remain alarmingly low (Velligan et al., 2009).

Naturalistic studies pointed to high non adherence rates ranging from 25 to 50% (Lacro et al., 2002; Nose et al., 2003). A number of

* Corresponding author. Institute of Psychiatry, Department of Neuropsychiatry, Faculty of Medicine, Ain Shams University, Abbasseyia, Cairo, Egypt.
E-mail address: info@elmissiry.com (A. El-Missiry).

http://dx.doi.org/10.1016/j.jpsychires.2015.09.006
0022-3956/

factors could be related to poor medication adherence among people with schizophrenia. These variables can be categorized into illness-related (Pinikahana, 2005), medication-related (Fenton et al., 1997), environmental-related factors (Owen et al., 1996), and patient-related factors (Moore et al., 2000). The latter include cognitive functions and individual's motivation for taking medication (Maeda et al., 2006).

The term cognition refers to the act of attending to stimuli in the environment and processing the information on several hierarchical levels. Cognitive functions include several domains mainly executive functions, memory, attention, vigilance, verbal tasks and social cognition (Burdick and Goldberg, 2008).

Cognitive deficits are thought to be a core feature of schizophrenia (Heinricks et al., 2013). Many studies have documented significant reduction of cognitive efficiency in patients with schizophrenia compared to normal subjects (Fioravanti et al., 2012; Bozikas et al., 2006; Zanelli et al., 2010; Lewandoweski et al., 2011a,b). These cognitive deficits involve impaired cognitive performance across a variety of measures as; executive function (Keefe and Harvey, 2012), memory function (Wobrock et al., 2009), vigilance and attention (Green et al., 2000), verbal fluency, psychomotor skills (Heinricks et al., 2013) and social cognition (Montreuil et al., 2010).

Cognitive dysfunction in schizophrenia can be a significant predictor of functional outcomes (Ziprusky, 2014) particularly global functioning, work performance, social skills acquisition and medication adherence (Hegde et al., 2013).

There are scarce and conflicting data on the association of cognitive impairment with antipsychotic non adherence (Buchanan et al., 1992; Jeste et al., 2003). Controversy still exists whether cognitive functions truly mediate functional outcome or may be related to medication non-adherence or service engagement (Johansen et al., 2011). Moreover, some investigators suggested that executive function (Maeda et al., 2006), memory impairment (Jeste et al., 2003), were strong predictors of adherence to medication, others, to the contrary, reported that non-adherent patients did better on tests of executive functions, verbal learning and memory, and having higher IQ than adherent patients (Yang et al., 2012, Jónsdóttir et al., 2013).

1.1. The rationale of the study

The relation between cognitive dysfunction and medication adherence was not previously studied in our region, however, research on other factors related to adherence to antipsychotic medication were previously investigated; as poor treatment satisfaction (Sweileh et al., 2012), patients involvement in folk therapy (El-Bahaey et al., 2005), insight and spiritually (Amr et al., 2013) or quality of life (Eticha et al., 2015).

The purpose of the study is to answer a basic question: Dose cognitive dysfunction relate to non adherence to antipsychotic drugs?

2. Material and methods

This is a prospective cohort study. The study was approved by the Ethical Committee of Ain Shams University, Egypt.

137 both male and female patients, aged between 18 and 50 years with the diagnosis of schizophrenia disorder according to the Diagnostic Statistical Manual of Mental Disorders 4th edition (DSM-IV) was preliminary recruited from the outpatient clinics of the Institute of Psychiatry, which is located at Eastern Cairo and serves both greater Cairo and the nearby governorates. Exclusion criteria were; history of drug dependence, past or present medical or neurological illness, head trauma, having IQ < 90 and receiving ECT before enrolment or during the follow-up period. Each patient signed a standard consent, after being informed about the nature and the confidentiality of the obtained information. The participation in this research was voluntary, and the participant has the freedom to withdraw at any time.

All enrolled patients underwent the following

1 **Confirmation of diagnosis** was done by senior clinical psychiatrists using the Research Version of the Structural Clinical Interview (SCID-I) (First et al., 1995). We used the Arabic version (El Missiry, 2003)
2 **Assessment of adherence** using: the Brief Adherence Rating Scale (BARS) (Byerly et al., 2008).

This is a pencil and paper clinician administered instrument used for assessing adherence to antipsychotic medications in patients with schizophrenia. The **BARS** provides valid, reliable, sensitive, and specific estimates of antipsychotic medication adherence with schizophrenia and schizoaffective disorder. The **BARS** consists of four items: three questions and an overall visual analogue rating scale to assess the proportion of doses taken by the patient in the past month to assess the patient's knowledge of their own medication regimen and episodes of missed medication taking, as follows: **1**. Number of prescribed doses of medication per day. **2**. Number of days in the past month when the patient did not take the prescribed doses. **3**. Number of days in the past month when the patient took less than the prescribed dose. The visual analogue scale rating is the key measure of adherence provided by the **BARS**. The BARS rating is reported as a percent of adherence (0%–100%), less than 70% indicate non adherence (Byerly et al., 2008). The BARS was rated by a clinical psychiatrists who were blind to the neuropsychological findings.

3. Assessment of cognitive functions

The assessment battery composed of tests relevant to cover intellectual abilities, memory and executive functions.

3.1. Wechsler Adult Intelligence Scale (WAIS)

The Wechsler Adult Intelligence Scale **(WAIS)** (Wechsler, 1981) is the most commonly administered general intelligence test for adults and is also viewed as a broad assessment of intellectual abilities. It is an individually administered measure of intelligence, intended for adults aged 16–89. It is the best standard and most widely used intelligence test in clinical practice and is intended to measure human intelligence reflected in both verbal and performance abilities. We used in this study the Arabic version of the **WAIS** by Melika (1996).

3.2. Wechsler Memory Scale-Revised (WMS-R) Wechsler, 1987 (Wechsler, 1987)

The Wechsler Memory Scale-Revised **(WMS-R)** is the most widely used instruments to assess memory functions in adults. It includes information and orientation questions, eight short-term memory tasks and four delayed recall trials, all of which take about 45 min to 1 h to administer. The subtests measure immediate and delayed components of verbal memory, verbal and figural stimuli, visual memory, immediate recall, episodic memory and visuospatial ability.

3.3. Wisconsin Card Sorting Test (WCST): we used the computerized version by Heaton et al., 2003 (Heaton et al., 2003)

The **WCST** was developed to assess the abstraction ability and