Remittances Review
April 2024,
Volume: 9, No: 2, pp.5312-5330
ISSN: 2059-6588(Print) | ISSN 2059-6596(Online)
Received : 20 March 2024, Accepted: 30 April 2024
DOI: https://doi.org/10.33282/rr.vx9i2.280

FACTOTS AFFECTING COGNITIVE DYSFUNCTION IN FIRST EPISODE PSYCHOSIS

1. Fouzia Sarfaraz
   PhD Scholar Department of Psychology, University of Peshawar, Pakistan. fouzia.khan@hotmail.com

2. Prof. Dr. Erum Irshad
   Professor Department of Psychology, University of Peshawar, Pakistan.
   erumirshad@hotmail.com

3. Dr. Rabia Amjad
   Assistant Professor, Psychology department, Women University Mardan.
   drrabia@wumardan.edu.pk

ABSTRACT

This main purpose of the study was to find out different factors that affect the level of cognitive dysfunction in the patients suffering from first episode psychosis. The study was conducted on 80 patients with equal number of male and female patients (M=40, F=40) with age ranging from 16 to 45 years. It was hypothesized that male patients will exhibit high level of cognitive dysfunction than female patients, early intervention will result in lower level of cognitive dysfunction. Different scales were used in the study including PANSS and Mini-Mental state Examination. Mini-mental state examination was used and the results shows that there is a slight difference in the level of cognitive dysfunction regarding gender with males having slightly higher level of

cognitive dysfunction (M =25.93, SD =2.77) as compared to female (M=26.25, SD=2.24) but this difference was not statistically significant. Early intervention resulted in low level of cognitive dysfunction (M= 26.95, SD=1.78) as compared to late interventions (M=23.50, SD= 2.63). It was concluded that male individuals of first episode psychosis had high level of cognitive dysfunction than females. Early interventions will decrease the level of cognitive dysfunctions. Untreated individuals of first episode psychosis are having high level of cognitive dysfunction than treated individuals. Moreover, high negative PANSS score results in high level of cognitive dysfunction.

Keywords: First episode Psychosis, Cognitive dysfunction, Mini mental state examination

INTRODUCTION:

Human beings suffer from two types of disorders namely physiological and psychological. Psychological disorders are then divided into two categories neurosis and psychosis. Neurosis includes those mental states which refer to some sort of unwanted emotional condition. Examples of neurotic disorders are anxiety disorder, bipolar disorder, obsessive-compulsive disorder, social phobias and social anxiety. While psychosis is a more intense form of mental disorder in which a person suffers from hallucination and delusion (Freeman et al., 2003). Different types of psychosis include Schizophrenia, Delusional disorder, Bipolar disorder, Postpartum psychosis, Schizoaffective disorder, Schizophreniform disorder, Depression with psychotic symptoms, Drug induced psychosis, Organic psychosis, Brief psychotic episode and First episode psychosis (Chiliza, 2015).

First episode psychosis refers to the condition in which a person experiences psychotic symptoms or a psychotic episode for the first time. Different symptoms of first episode psychosis are hallucination, delusions, changed feelings, changed behavior and confused thinking. There can be several types of hallucinations such as auditory, visual, taste, smell and touch. Second person auditory hallucinations and delusions are the most commonly reported psychotic symptom in early psychosis (Rajapakse et al., 2011).

There are three phases of first episode psychosis. These three phases include, the prodromal phase, the acute phase and the recovery. It is not important that all people having psychotic episode will experience clear symptoms of all three phases (Fusar-Poli et al., 2017).

During prodromal phase of psychosis symptoms can develop ranging from slight changes in the premorbid functioning to the fully developed psychosis (Hafner et al., 1993). These changes include; the initial symptoms that come to surface before the disorder fully develops and its symptoms are apparent, or a phase in which the individual's behavior reflects a shift from the individual's past behavior and experience, hence reflecting a disturbance (Yung & McGorry, 1996).

During the acute phase the psychotic symptoms are recognized, diagnosed and treatment is provided. Lieberman et al. (1993) and Power et al. (1998) had given detailed information about the treatment during acute phase of first episode psychosis. The initial acute phase of first-episode psychosis is an important phase to start an effective treatment to improve the patient's outcome (Malla & Norman, 2002).

The last phase of first episode psychosis is the recovery. During this phase majority of the patients recover from the first episode of psychosis if proper treatment is provided with good compliance (Catalan et al., 2021).

Early diagnosis of first episode psychosis will reduce both psychological and social disturbances (Birchwood et al, 1998). While treating first episode psychosis it is important to consider Psycho-social interventions such as supportive therapy, group therapy, cognitive behavior therapy and vocational counseling. Along with Psycho-social intervention, pharmacological treatments are also effective. It decreases the symptoms of psychosis and help in preventing further episodes of illness. Most of the patients of first episode psychosis show good response to anti-psychotic drugs (Lieberman, 1996). There is a remission in 50% of the symptoms of first episode psychosis within three months after the start of anti-psychotic medicines and 80% remission at one year (Lieberman et al., 2001).

The word cognition refers to higher mental processes like thinking skills, to understand and react to information, intellectual skills, attention, problem solving and interpretation of information. Cognitive dysfunction is common in some mental illness and it can result in problems in thinking, memory, reasoning, judgment and executive functioning (Vishnu & Hannele, 2005). The occurrence of cognitive dysfunction in schizophrenia is well established but it has been reported that first episode psychosis also affects the cognitive dysfunction greatly. According to few studies there is selective executive dysfunction in first episode psychosis and schizophrenia (Weinberger et al., 1986).

Saykin et al. (1994), conducted a study on a group of thirty-seven patients, all with first-episode psychosis. Their study noted attention to be selectively impaired in the group of patients. Moreover, the extent of this impairment in attention was lesser as compared to memory.

First episode psychosis is a novel term in research worldwide. Very little work has been done in this field especially in the field of cognitive dysfunctions and the factors that affects cognitive dysfunctions in first episode psychosis. In the same way little work has been done on psychotic disorder and first episode psychosis in this sub-continent and especially in Pakistan. So, the present study is designed to find out the factors that has an effect on cognitive dysfunction in first episode psychosis. This study will also help the treatment providers to make accurate diagnosis and so early interventions can be provided which will enhance the quality of life which in turn will positively affect his/her relationship and functioning in the society.

METHODOLOGY:

It was a descriptive observational study. A purposive sample of 80 respondents (N=80) suffering from first episode psychosis with equal number of male and female individuals (M=40, F=40) were selected for the study after obtaining ethical approvals from the concerned hospitals. All the participants were fully briefed about nature of the study. They were included in the study after obtaining written consents.

Inclusion criteria: Patients suffering first episode psychosis were included in the study. Patients who had not received any pharmacological treatment were included in the study.

Exclusion criteria: Patients suffering from any other psychological disorder, psychosis due to general medical condition and patients who had received pharmacological treatment were not included in the study.

Hypotheses

For this research study the following hypothesis were formulated.

1. Male patients of first episode psychosis will have high level of cognitive dysfunction than female patients
2. Early interventions in first episode psychosis will result in low level of cognitive dysfunction as compared to late interventions.
3. Level of cognitive dysfunction will be high in untreated patients than treated patients.
4. Patients who score high on negative sub-scale of PANSS will have high level of cognitive dysfunction than patients who score high on positive sub-scale.

Instruments

In the present study the following scales were used:

- **In-depth clinical interview:**

An in-depth clinical interview was conducted with the patients and the attendants to get information about the history, duration and severity of the problem. The relevant information was recorded on a semi structured Performa sheet.

- **Mini mental state examination**

Mini mental state examination is used to screen for cognitive dysfunction. It is a 30-point questionnaire test having internal consistency ranging from .66 to .79 and inter-rater reliability ranging from 0.94 to 0.99. Score greater than or equal to 25 points (out of 30) indicates a normal cognition. Below this score indicate severe (≤9 points), moderate (10-20 points) or mild (21-24 points) cognitive impairment (Folstein, et al 2012).

- **Positive and Negative Syndrome Scale.**

The PANSS is a 30 items scale having seven positive symptom items, seven negative symptom items and 16 general psychopathology symptom items. Each item is scored on 7-point severity scale. The alpha coefficients for the Positive and Negative Scales are .73 and .83. The patient is rated from 1 to 7 on 30 different symptoms depending upon the interview as well as reports of family members or primary care hospital workers. (Stanley, 1987).

Procedure

The present study was conducted in three phases.

Phase I

In phase one patients of first episode psychosis were selected after a formal permission from the head of psychiatry wards. Rapport was developed and written informed consent was taken after providing a complete description and purpose of the study to **t**he subjects and their attendants. After that, in-depth clinical interview was conducted with the patients.

Phase II

In phase two Mini Mental State Examination was applied on the patients selected for the study to measure their cognitive functions. PANSS scale was applied to measure the severity of positive and negative symptoms of psychosis. Any form of Pharmacological interventions provided by the psychiatrist were recorded.

Phase III

In phase three after three months the same patients were reassessed and their score were again calculated on PANSS and Mini Mental State Examination. These scores were compared with the score taken in phase two and the difference was calculated. After the collection of data, it was statistically analyzed.

Results:

The results of the current study were analyzed using SPSS. Statistical analysis was done to test the significance of the results.

Remittances Review
April 2024,
Volume: 9, No: 2, pp.5312-5330
ISSN: 2059-6588(Print) | ISSN 2059-6596(Online)

Table 1

Means, Standard Deviation and t-value for male and female patient of first episode psychosis on Mini Mental State Examination Scale (N=80)

	Male (n=40)		Female (n=40)				95% CI		
Variables	*M*	*SD*	*M*	*SD*	*t (78)*	*p*	*UL*	*LL*	Cohen's d
Cognitive Dysfunction	25.93	2.7	26.25	2.24	.58	.79	-1.44	0.79	

Note. M=mean; SD=standard deviation; CL=confidence interval, LL=lower limit, UL = upper limit

Table 1 indicates that there is a non-significant difference between male and female respondents of first episode psychosis. According to the results in the above table male respondents experiences slightly higher cognitive dysfunction than female respondents (M=25.93, SD=2.77 and M=26.25, SD=2.24). The score of cognitive dysfunctions indicate that male respondents have slightly higher cognitive dysfunction than female respondents but this mean difference is not statistically significant as p >.05

Remittances Review
April 2024,
Volume: 9, No: 2, pp.5312-5330
ISSN: 2059-6588(Print) | ISSN 2059-6596(Online)

Table 2

Means, Standard Deviation and t-value for early and late intervention patients in first episode psychosis on Mini Mental state Examination Scale (N=80)

	Early Intervention (n=60)		Late Intervention (n=20)				95% C.I		
Variables	*M*	*SD*	*M*	*SD*	*t(78)*	*p*	*UL*	*LL*	Cohen's d
Cognitive Dysfunction	26.95	1.78	23.50	2.63	6.62	.000	2.41	4.49	

Table 2 indicates that there is a highly significant mean difference between early and late intervention on cognitive dysfunction in individuals suffering from first episode psychosis. Early interventions resulted in low level of cognitive dysfunction (M=26.95, SD=1.78) as compare to the late intervention (M=23.50, SD=2.63). The difference was statistically significant.

Remittances Review
April 2024,
Volume: 9, No: 2, pp.5312-5330
ISSN: 2059-6588(Print) | ISSN 2059-6596(Online)

Table 3

Descriptive Statistics and paired sample t-test to compare the influence of treatment on Cognitive Dysfunction of the patients (N=80)

	On 1st Visit			On 2nd Visit		95% CI for Mean Difference		
Outcome	M	SD		M	SD		r	t
Cognitive Dysfunction	26.09	2.51		29.60	0.95	-3.99, -3.04	.547**	-14.67**

**p< .001.

Above table shows the mean differences and correlation between the level of cognitive dysfunction in treated and untreated individuals suffering from first episode psychosis. There is a statistically high significant mean difference as $p < .001$. The individuals on 1st visit have higher cognitive dysfunction but when they were provided with treatment their cognitive dysfunction improved as compared to first visit.

Remittances Review
April 2024,
Volume: 9, No: 2, pp.5312-5330
ISSN: 2059-6588(Print) | ISSN 2059-6596(Online)

Table 4

Means, Standard Deviation and t-value having low and high Negative PANSS patients in first episode psychosis on MMSE Scale (N=80)

	Low Negative PANSS (n=42)		High Negative PANSS (n=38)		95% C.I				
Variables	*M*	*SD*	*M*	*SD*	*t(78)*	*p*	*UL*	*LL*	Cohen's d
Cognitive Dysfunction	27.62	1.21	24.39	2.48	7.48	.000	2.37	4.08	

Table 4 indicates that there is a significant mean difference between low negative PANSS score and high negative PANSS score in individuals of first episode psychosis on MMSE Scale. Patients having Low negative PANSS score are having low level of cognitive dysfunction (M=27.62, SD=1.21) as compare to patients having high negative PANSS score (M=24.39, SD=2.48) on MMSE scale.

Remittances Review
April 2024,
Volume: 9, No: 2, pp.5312-5330
ISSN: 2059-6588(Print) | ISSN 2059-6596(Online)

Table 5

Means, Standard Deviation and t-value having low and high Positive PANSS patients in first episode psychosis on MMSE Scale (N=80)

	Low Positive PANSS (n=40)		High Positive PASNS (n=40)		95% C.I				
Variables	*M*	*SD*	*M*	*SD*	*t(78)*	*p*	*UL*	*LL*	Cohen' s d
Cognitive Dysfunction	26.63	2.55	25.55	2.38	1.95	.055	-0.02	2.17	

Table 5 indicates that there is a non-significant mean difference between low and high positive PANSS patients in first episode psychosis on MMSE Scale. Patients having Low positive PANSS score low level of cognitive dysfunction (M=26.63, SD=2.55) as compare to patients having high positive PANSS (M=25.55, SD=2.38) on the scale.

DISCUSSION:

The first hypothesis of the study was that "male patients of first episode psychosis will suffer from higher level of cognitive dysfunction than the female patients". The results of this hypothesis indicates that male patients experience more cognitive dysfunction than female patients with (M=25.93, SD=2.77 and M=26.25, SD=2.24). But this difference in the scores is statistically insignificant. Although mean difference is not statistically significant as p >.05 but

still the male respondents showed more dysfunction in their cognition as compared to females. A related study done by Maric et al. (2003) found the same results and they concluded that male patients have high level of negative symptoms than female that can be the reason of the higher cognitive dysfunction. In another study by Pang et al. (2016) studied 533 patients out of which 258 were female and 275 males. They found a marked difference in the cognitive functions between male and female patients. Arriola et al. (2014) in their study on 74 women and 86 men found no gender difference in the neurocognitive function in the patients of first episode psychosis.

The second hypothesis of the study was “early interventions in first episode psychosis will result in low level of cognitive dysfunction as compared to late interventions”. Statistical analysis of the data proves the hypothesis which has been shown in Table 2. This table indicates that there is a highly significant mean difference between early and late intervention in the respondents suffering from first episode psychosis. Early intervention in the patients resulted in low level of cognitive dysfunction

Work done in the past on the relationship between duration of untreated psychosis and cognitive dysfunction shows that there is a positive correlation between duration of untreated psychosis (DUP) and cognitive dysfunction. Rebhi et al. (2015) on the patients of first episode psychosis concluded that all domains of cognitive functions were impaired with longer DUP.

The third hypothesis of the study was that “the level of cognitive dysfunction will be high in untreated patients than treated patients”. Statistical analysis of the data proved the hypothesis. The results have been shown in table no 3. Results show the mean differences and correlation

between the scores of the patients of first episode psychosis on MMSE during first and second visits. There is a statistically highly significant mean difference as $p < .001$. The patients on 1st visit have higher cognitive dysfunction as compared to after the treatment. The relationship between 1st visit and 2nd visit is also positive and high on cognitive dysfunction.

Davidson et al. (2009) investigated the effect of different types of treatment on the cognitive dysfunctions of first episode psychosis. The studied 498 first episode patients and they found that there has been marked decrease in the cognitive dysfunction no matter what type of anti-psychotic drugs are used. Riedel et al. in 2010 conducted a study on the patients of first episode psychosis in which they tried to find out the effect of different anti-psychotic drugs on the level of cognitive dysfunction. For this purpose, they took 129 first episode psychotic patients and they assessed the level of cognitive dysfunction before and after the treatment. They concluded that the patients showed marked improvement in all domains of cognitive functions from baseline to week 8. Another study with the same results was done by Guo et al. (2011).

Fourth hypothesis of the study was “Patients who score high on negative sub-scale of PANSS will have high level of cognitive dysfunction than patients who score high on positive sub-scale”. The results indicates that patients having low negative PANSS in first episode psychosis have lower cognitive dysfunction as compared to patients having high negative PANSS. In 2016 Trauelsen et al. compared 97 patients of first episode psychosis with 101 control individuals. Based on positive and negative symptoms. They concluded that patients with high levels of negative symptoms were reported with poor meta-cognitive functions. In a study done by Saleem

et al. (2013) in UK, a strong relationship between negative symptoms and cognitive dysfunction in the south Asian patients of first episode psychosis was noted.

CONCLUSION

It was concluded that male patients showed more deterioration in their cognitive functions than female when they were suffering from first episode psychosis but it was not statistically significant. The level of cognitive dysfunction was low in patients who received timely intervention. Longer duration on untreated psychosis results in more severe symptoms. It was also concluded that patients with high level of negative symptoms results in more cognitive dysfunction than the positive symptoms.

Type of manuscript: Original article
Running title: cognitive dysfunction in first episode psychosis
Funding/Conflict of interest: None

REFERENCES

Arriola, R. A., Sanchez, J. M. R ., Ruiz, E. G., Santianez, R. R., Reeves, L. L. & Facorro, B. C. (2014). No sex differences in neuropsychological performance in first episode psychosis patients. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, (3) 149–154. doi: http://dx.doi.org/10.1016/j.pnpbp.2013.09.009

Birchwood, M., Todd, P. & Jackson, C. (1998). Early intervention in psychosis. The critical period hypothesis. *British Journal of Psychiatry*, 172, 53-59.

Catalan, A., Richter, A., De Pablo, G. S., Vaquerizo-Serrano, J., Mancebo, G., Pedruzo, B., ... & Fusar-Poli, P. (2021). Proportion and predictors of remission and recovery in first-episode psychosis: Systematic review and meta-analysis. *European Psychiatry*, *64*(1), e69.

Chiliza, B. (2015). *A prospective study of clinical, biological and functional aspects of outcome in first episode psychosis* (Doctoral dissertation, Stellenbosch: Stellenbosch University).

Davidson, M., Galderisi, S., Weiser, M., Werbeloff, N., Fleischhacker,W.W., Keff, R. S.....Khan, R. S. (2009). Cognitive effects of antipsychotic drugs in first-episode schizophrenia and schizophreniform disorder: a randomized, open-label clinical trial (EUFEST). *American Journal of Psychiatry*;166(6):675-82. doi: 10.1176/appi.ajp.2008.08060806.

Folstein, F. M., Susan, E., Folstein, E. S., Melissa, A., & Messer, M. A. (2012). Mini-Mental State Examination, 2nd Edition. Retrieved from *http://www.psychassessments.com.au/Category.aspx?cID=401*

Freeman, D., & Garety, P. (2003). Connecting neurosis and psychosis: The direct influence of emotion on delusions and hallucinations. *Behaviour Research and Therapy*, 41, 923–947.

Fusar-Poli, P., McGorry, P. D., & Kane, J. M. (2017). Improving outcomes of first-episode psychosis: an overview. *World psychiatry*, *16*(3), 251-265.

Gopal, Y. V. & Variend, H. (2005). First-episode schizophrenia: review of cognitive deficits and cognitive remediation. *Advances in Psychiatric Treatment, 11, 38-44.doi*: 10.1192/apt.11.1.38

Guo, X., Zhai, J., Wei, Q., Twamley, E. W., Jin, H., Fang, M., ...Zhao, H. (2011). *Neuroscience Letters;*503(2):141-6. doi: 10.1016/j.neulet.2011.08.027.

Hafner, H., Maurer, K., Loffler, W. & Riecher-Rossler, A. (1993). The influence of age and sex on the onset and early course of schizophrenia. *British Journal of Psychiatry*, 162:80-86.

Kay, S. R., Fizbein, A. & Opler, L. A. (1987). The positive and negative syndrome scale (PANSS) for schizophrenia. *Schizophrenia Bulletin*,13(2): 261-276.. Retrieved from: *http://www.ncbi.nlm.ni h.gov/ pubmed /3616518*

Lieberman, J. A, Perkins, D., Belger, A., Chakos, M., Jarskog, F., Boteva, K. & Gilmore, J. (2001). The early stages of schizophrenia: speculations on

pathogenesis, pathophysiology,and therapeutic approaches. *Biological Psychiatry,* 50:884–897. Retrieved from: http://www.ncbi.nlm.nih.gov/pubmed/11743943.

Lieberman, J. A., Koreen, A. R., Chakos, M., Sheitman, B., Woerner, M, Alvir, J. M. & Bilder, R. (1996). Factors influencing treatment response and outcome of first-episode schizophrenia: implications for understanding the pathophysiology of schizophrenia. *Journal of Clinical Psychiatry*, 57(9):5-9

Lieberman, J., Jody, D., Geisler, S., Alvir, J., Loebel, A., Szymanski, S., Woerner, M. & Borenstein, M. (1993). Time course and biologic correlates of treatment response in first-episode schizophrenia. *Arch Gen Psychiatry*, 50(5):369-76. Retrieved from: http://www.ncbi.nlm.nih.gov/pubmed/8098203

Malla, A. K., Norman, R.M., Manchanda, R. & Townsend, L. (2002). Symptoms cognition, treatment adherence and functional outcome in first-episode psychosis. *Psychological Medicine*, 32:1109–1119. Retrieved from: http://www.ncbi.nlm.nih.gov/pubmed/12214790.

Maric, N., Krabbendam, L., Vollebergh, W., De Graff, R. & Van Os, J. (2003). Sex differences in symptoms of psychosis in a non-selected, general population sample. *Schizophrenia Research* 63(1-2), 89-95.

Pang, S., Subramaniam, M., Abdin, E., Poon, L. Y., Chong, S. A. & Verma, S. (2016). Gender differences in patients with first-episode psychosis in the Singapore Early Psychosis Intervention Program. *Early Intervention in Psychiatry*, 10(6) 528-538. doi: 10.1111/eip.12208.

Power, P., Elkins, K., Adlard, S., Curry, C., McGorry, P. & Harrigan, S. (1998). Analysis of the initial treatment phase in first-episode psychosis. *British Journal of Psychiatry*, 172(33):71-6. Retrieved from: http://www.ncbi.nlm.nih.gov/pubmed/9764130

Rajapakse,T., Garcia-Rosales, A., Weerawardene, S., Cotton, S. & Fraser, R. (2011). Themes of delusions and hallucinations in first-episode psychosis. *Early Intervension in Psychiatry*, 5(3):254-8. doi: 10.1111/j.1751-7893.2011.00281.x.

Rebhi H, Cherif W, Larbi L, Ben Alaya S, Cheour M.(2015). Duration of untreated psychosis and cognitive impairment. *European Psycho pharmacology*. doi: http://dx.doi.org/10.1016/S0924-977X(15)30637-4

Riedel, M., Schennach, W. R., Musil, r., Dehning, S., Cerovecki, A., Opgen, R. M., Spellmann, I., (2010). Neurocognition and its influencing factors in the treatment of schizophrenia-effects of aripiprazole, olanzapine, quetiapine and risperidone. *Human Psycho pharmacology*, 25(2):116-25. doi: 10.1002/hup.1101.

Saleem, M. M., Harte, M. K., Marshell, K. & Neill, J. C. (2013). First episode psychosis patients show impaired cognitive function - A study of a South Asian population in the UK. *Journal of Psychopharmacology,* 27(4). doi: 10.1177/0269881113477746 Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/23427189

Saykin, A. J., Shtasel, D. L., Gur, R. E., Kester, D. B, Mozley, L. H., Stafiniak, P., Gur, R. C. (1994). Neuropsychological deficits in neuroleptic naive patients with first-episode schizophrenia. *Archive of General Psychiatry*. 1994;51:124–131.

Trauelsen, A. M., Gumley, A., Jansen, J. E., Pedersen, M. B., Nielsen, H. G. L.,.... Simonson, E.(2016). Meta cognition in first-episode psychosis and its association with positive and negative symptom profiles. *Psychiatry Research,;*238, 14-23. doi: http://dx.doi.org/10.1016/j.psychres.2016.02.003

Weinberger, D.,R., Berman,K. F. & Zec, R.. F. (1986). Physiologic dysfunction of dorsolateral prefrontal cortex in schizophrenia. I. Regional cerebral blood flow evidence. *Arch Gen Psychiatry*, 43(2):114-24. Retrieved from: http://www.ncbi.nlm.nih.gov/pubmed/3947207

Yung, R. A., & McGorry, D. P. (1996). The prodromal phase of first-episode psychosis: Past and current conceptualizations. *Schizophrenia Bulletin*, 22, 353–370.