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Review article

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### A review on Schizophrenia and neuropsychological treatment by herbal drugs

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#### ABSTRACT

Schizophrenia is a chronic neurodegenerative disorder which is symptomized by the hallucination, memory impairment and other cognitive manifestations. Patient of schizophrenia mainly seems as they have lost their contact with the reality. As per the epidemiological studies done, it is a very less common mental illness but sometimes may cause fatal conditions and results in suicide. The common natural drug used in treatment which has shown development in memory is *Ginkgo Biloba*, *Bacopa monnieri* (Bramhi), *Shankh pushpin*, Reserpine and many other herbal drugs.

#### INTRODUCTION

The schizophrenia term was coined from the Greek which means “split mind”. The group of schizophrenic patient was mainly characterized by the symptoms such as fragmentation of brain, alteration of thoughts.

#### Facts about schizophrenia

Schizophrenia influences roughly 1% of the populace worldwide and is a chronic neurodegenerative disorder, lacking therapeutic treatment. The suicide rate is as high as 9-13%, with the frequency of suicide endeavor achieving half of analyzed patients over a lifetime [1, 2]. The beginning of schizophrenia generally happens around 18-25 years old and is regularly gone before by premorbid conduct deviations, for example, social withdrawal and emotional changes [3]. Moreover, most patients determined to have

schizophrenia stay away forever to school or work [4].

#### Aetiology

The following hypothesis describes the cause of the schizophrenia:

#### Dopamine (DA) Hypothesis

The dopaminergic hypothesis of schizophrenia lays for the most part on the way that the clinical impacts of all antipsychotic drugs are bar of the dopamine-2-receptor (D<sub>2</sub>R) [5, 6]. Additional proof for a hyperdopaminergic state, fundamental schizophrenia, originates from perceptions that d-amphetamine can prompt psychosis in healthy subjects [7]. D-amphetamine compounds positive indications in patients with schizophrenia, which is joined by a raised increment in DA discharge, and over action of striatal D<sub>2</sub>Rs, contrasted with controls [8, 9]. Along these lines, DA is a key

player in the pathophysiology of schizophrenia explicitly in regards to the positive side effects.

### Neurodevelopmental hypothesis

Neuroanatomical investigations of patients with schizophrenia have reliably indicated augmented ventricles, decreased cerebrum volume, anomalous hippocampal volume, and degenerate layering of the cortex [10, 11]. An investigation by Susser and Lin (1992) demonstrated that offspring of pregnant moms who were casualties of starvation during the Dutch starvation, 1944-45, showed an expanded occurrence of schizophrenia in grown-up life. Birth intricacies, for example, hypoxia and maternal flu, during the second trimester of pregnancy, have been found to associate with expanded frequency of schizophrenia in posterity [12-14].

### Glutamate hypothesis

Glutamate applies its impact as a synapse by means of following up on four various types of receptors, to be specific N-methyl-D-aspartate (NMDA),  $\alpha$ -amino-3-hydroxy-5-hydroxy-5-methyl-4-isoxazolepropionate (AMPA), metabotropic Glutamate (mGlu) receptors. [15, 16].

The N-methyl-D-aspartate receptor (NMDAR), in participation with the  $\alpha$ -amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid receptor (AMPA), assumes significant roles in cognitive working, for example, learning and memory [17]. These two receptors are moreover connected with schizophrenia [18]. In addition, a few helplessness qualities, controlling neurodevelopmental sub-atomic procedures, synaptogenesis and NMDAR working in schizophrenia have been found [19]. These discoveries propose a rational speculation combining hereditary susceptibility, neurodevelopmental anomalies, and data handling shortfalls together with glutamatergic variation from the abnormality, in disclosing the schizophrenia.

The single most grounded prescient factor for creating schizophrenia is a family ancestry including a first degree relative with the confusion [20]. A few ecological hazard factors for creating schizophrenia have been proposed, for example, urban living, settler status, and communicated feeling inside the family, with changing outcomes [21-23]. Besides, regular birth, maternal flu, conveyance difficulties, and nourishing confinement are predictors of expanded hazard for schizophrenia in grown-up life. These hazard

variables support a neurodevelopmental hypothesis of schizophrenia [24].

## SYMPTOMS OF SCHIZOPHRENIA

The symptoms of schizophrenia are divided into following three categories; positive symptoms, negative symptoms, and cognitive deficits [25, 26].

### Positive symptoms

Positive manifestations are hallucinations, delusions and disorganized behavior. Hallucinations regularly happen inside the sound-related area, for example, "hearing voices" that are frequently of an undesirable and decrying nature. Delusions might be gaudy or neurotic and can become impairing, as they are joined in and govern day by day living. The positive side effects are cyclic in nature and are reduced dependably by accessible antipsychotic treatment [27].

### Negative Symptoms

Negative manifestations are described by loss of "ordinary" working, are unending, and incorporate anhedonia (loss of pleasurable feelings), leveled influence (for example blunted feelings), avolition (absence of activity), and social withdrawal. Social withdrawal and absence of social perception may in actuality be a side effect classification of its own. When all is said in done, negative side effects are, best case scenario just mostly eased by accessible antipsychotic treatment [28, 29].

### Cognitive deficits

Cognitive deficits incorporate challenges with consideration, language, a few parts of memory, official working, subjective adaptability, and understanding of meaningful gestures [30-34]. Cognitive deficits are not satisfactorily lightened by accessible antipsychotic treatment. Henceforth, there is a need to create successful pharmacological intercessions for treating this class of disabling deficits [35].

### Herbal medicine used in treatment of schizophrenia

In traditional practices of medication, various plants have been utilized to treat subjective issue, including neurodegenerative sicknesses, for example, Schizophrenia, AD and other memory related issue. There are various medications accessible in markets that have been confined from

plants, for example alkaloids from plant sources have been researched for their potential in AD treatment, and are currently in clinical use. Typically natural arrangements are all around endured however they may have destructive reactions, incorporating collaborations with pharmaceuticals [36]. Natural medications, for example, *Ginkgo Biloba*, *Bacopa monnieri* (Bramhi) [37], *Shankh pushpi* and so forth, has been found to expand memory control.

Recently, there has been exceptional interest for the capability of flavonoids to balance neuronal capacity and counteract age-related neurodegeneration. for example, the citrus flavanone tangeretin, have been seen to keep up Nigro-striatal trust worthiness and usefulness following lesioning with 6-hydroxydopamine, recommending that it might act as a potential neuroprotective specialist against the hidden pathology related with Parkinson's malady [38].

Reserpine, an antipsychotic drug which has been extracted from the dried root of plant *Rauvolfia serpentina* species used in the treatment of schizophrenia. [39].

### Drug used to treatment of neurodegenerative disorder

1. Kulkarni S.K. & Dhir A., 2008 studied *Withania somnifera* which is popularly known as Ashwagandha and is widely considered as the Indian ginseng. This plant extract is widely used in treatment of various central nervous system (CNS) disorders, mainly its indication in epilepsy, stress and neurodegenerative diseases such as Parkinson's and Alzheimer's disorders, dyskinesia, cerebral ischemia.
2. Mohammadi M., Khole s., 2009 shows that the *Pterocarpus marsupium* has potent antioxidant which was studied by using the in-vitro antioxidant capacity assays and various methods. It can be used in various treatment of the human disease such as cardiovascular disease, Diabetes, Neurodegenerative disorders, cancer and arthritis.
3. RajaSankar S. et al., 2009 had done study on the treatment of Parkinson's disease using mouse model in which they used *Withania somnifera* root extraxt (100 mg/kg body weight). The root extract improves catecholamines and physiological abnormalities which are the seen in the Parkinson's disease.
4. Jayaprakasam B. et al, 2010 done research on *Withania somnifera* in treatment of Alzheimer's

Disease (AD) by using Rat pheochromocytoma (PC-12) cells were purchased from American cell type collection culture (ATCC, Rockville, MD, USA). The amyloid  $\beta$  and tau proteins are main targets for developing AD therapies. The study show that the fruit extract of the *Withania somnifera* help to reduce the amyloid  $\beta$  and tau proteins which lead to cell death by the oxidation.

5. Uabundit N., et al., 2010 done study on Alzheimer's disease model by using the alcoholic extract of *Bacopa monnieri* (BW) for Cognitive enhancement and neuroprotective effects. The Alzheimer's disease induced by ethylcholine aziridinium ion (AF64A). Male Wistar rats were orally administered with the alcoholic extract of *Bacopa monnieri* at doses of 20, 40 and 80 mg/kg BW for 2 weeks and after 1 week the intracerebroventricular administration of AF64A bilaterally. *Bacopa monnieri* extract enhanced the escape latency time ( $p < .01$ ) in Morris water maze test which *Bacopa monnieri* is a potential cognitive enhancer and neuroprotectant in Alzheimer's disease.
6. Chauhan & Chaudhary, 2011 studied Memory enhancing activity of methanolic extract of *Pterocarpus marsupium* Roxb. in albino mice. *P. marsupium* was administered orally in doses of 25 and 50 mg/kg and the mice were tested 30 min after the drug administration and various analysis were done and observed that the *P. marsupium* has potent nootropic activity.
7. Bhupendra C. & Amrendra K.C., 2012 studied about the Memory enhancing activity of methanolic extract of *Pterocarpus marsupium* Roxb. Methanolic extract of *P. marsupium* (25 and 50 mg/kg p.o.) were given in adult albino Swiss mice for neurotoxicity test for learning and memory. *P. marsupium* shows great improved scopolamine induced amnesia with evidence increasing inflexion ratio and decreases transfer latency and improves the impairment of spatial memory induced by scopolamine as directed by development of working memories.
8. Kosaraju J., Madhunapantula S., et al., 2014 did research on Dipeptidyl- peptidase -4 inhibition by *Pterocarpus marsupium* & *Eugenia jambolana* ameliorates streptozotocin induced Alzheimer's disease(AD) and found by inducing the dose of *Pterocarpus marsupium* (PM) & *Eugenia jambolana*(EJ) there is decrease in amyloid beta 42, total tau levels, phosphorylated tau and neuro-

inflammation with an increase in glucagon-like peptide-1 (GLP-1) levels. Thus, PM and EJ extracts contain cognitive enhancers & neuroprotective agents against Streptozocin induced AD.

9. Rahman S., et al 2018 studied about the Ethnobotanical uses, Phytochemistry and Pharmacological activities of *Pterocarpus marsupium* and found that the different parts of the plant are used for cardiogenic, anti-inflammatory, anti-diabetic and various other uses. Some parts of plant also show nootropic activity along with the anticataract, antifungal, aphrodisiac and anthelmintic activities.

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## CONCLUSION

As discussed in the review article, the Schizophrenia is a deadly neurodegenerative disease which is mainly due to different physiological and psychological factors. It can occur from young individual and old age people which mainly cause dementia, hallucinations, delusions and disorganized behavior in the patients. It is one of the disorders which mainly responsible for the fatal conditions.

The herbal treatment is one of the advance and effective treatment of the disease which treat the disease with minimal side effect. As per the etiological studies, in the coming few years this disease could be increase thus the herbal treatment should be preferred for therapy of the neurodegenerative disorders.

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