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Antipsychotic activity of herbal plants: A review

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Abstract
Mental illness, a crucial mutual health problem, is a chronic frequent neuropsychiatric disorder that adversely affects the quality of life of the patient. About 1% of the world population is affected by a chronic debilitating neuropsychiatric disease i.e., Psychosis. Psychosis may be minor or major, major psychosis termed as schizophrenia. Schizophrenia is a severe neuropsychiatric disorder, characterized by disturbance in thinking which affects speech, perception and the sense of self. The one pharmacological property common by all available antipsychotics is blockade of the dopamine D2 receptor. Direct blockade of the D2 receptor and secondary depolarization blockade both appear relevant to antipsychotic action. Albizia zygia root extract, Viscum album L. (Loranthaceae), Desmodium adscendens, Synedrella nodiflora (L) Gaertn, Lonchocarpus cyanescens, Noni (Morinda citrifolia Linn.) are the plants which having antipsychotic effect. Some dietary supplement which also use full in the management of psychosis.

Keywords: Schizophrenia, Dopamine, Amphetamine, D2 Receptor, Antipsychotic

Introduction
1% of the world population is affected by a chronic debilitating neuropsychiatric disease i.e., Psychosis [1]. Mental illness, a crucial mutual health problem, is a chronic frequent neuropsychiatric disorder that adversely affects the quality of life of the patient [2]. Although the cause of the neuropsychiatric disorder is unknown, hyperdopaminergic action is firmly associated with the pathogenesis of psychosis [3, 4]. Particular with psychosis are more prone to suicide, depression, anxiety, aggression, substance abuse, cognitive impairment, victimization, poverty and increased medical problems [5]. Psychosis may be minor or major, major psychosis termed as schizophrenia. Schizophrenia is a severe neuropsychiatric disorder, characterized by disturbance in thinking which affects speech, perception and the sense of self [6]. Symptoms are typically classified into three broad categories: positive, negative and cognitive. Positive symptoms include hallucinations and delusions. Negative symptoms encompass blunted affect, loss in social functioning, depression and destruction. Cognitive symptoms consist of loss in working and long-term memory, absolute control, attentiveness and sense [7]. Treatment includes medical therapy and a range of psychosocial interference. The aim and objectives of treatment are to knock off repetition and harshness of psychotic exacerbation, mitigate a broad range of symptoms, and improve functional quantity and quality of psychotic life. A half-century ago, standard therapy for schizophrenia subsists of subjecting patients with a secure and supporting environment in a long-stay psychiatric hospital. The introduction of chlorpromazine, the first antipsychotic medication incites revolution in the therapy of schizophrenia. Since that time, antipsychotics have become the pillar of pharmacologic treatment for schizophrenia [8].

Pharmacology of antipsychotics
In neuropsychiatric antipsychotic medications reduces aberrant behavior, disturbance and aggressiveness and controls psychotic symptoms. Disturbed mood and behavior are gradually decreased, anxiety is relaxed. Hyperactivity, hallucinations and delirium are suppressed. Anti- psychotics have pharmacologically been classified into two major groups: first-generation (conventional) agents (FGAs) and second-generation (atypical) agents (SGAs). The one pharmacological property common by all available antipsychotics is blockade of the dopamine D2 receptor (eg, antagonism or, in the case of aripiprazole, partial agonism) [9, 10]. Direct blockade of the D2 receptor and secondary depolarization blockade both appear relevant to antipsychotic action [11]. Thus, these agents have their onset of action within a few days and then achieve much of their antipsychotic effect over several weeks. However, the currently available antipsychotic drugs differ in the term to which they block the D2 receptor at therapeutic dose (indicated by percentage of receptor occupancy), which has significance for their clinical quality [12].

Comparative symptoms

Neuropsychiatric is described by positive, negative, cognitive, and psyche symptoms, with the types and harshness of symptoms different among patients and over the course of the illness. FGAs are active in reducing positive symptoms (eg, hallucinations, delirium), but are only little effective for negative and cognitive symptoms, which contribute to much of the defect associated with schizophrenia. FGAs are also identical with serious treatment burdens, including acute EPS and tardive dyskinesia (TD) [13].

Psychosocial treatments

This overview focuses on pharmacological therapyt, various psychological and social mediation are required to enhance recovery and should constitute an essential part of therapy for schizophrenia. Research on psychosocial approaches has demonstrated the efficacy of cognitive behavioral therapy, social skills training, family psychoeducation, assertive community treatment, and sup- ported employment, and these approaches are recommended in the recent publication on psychosocial interventions by the Schizophrenia Patient Outcomes Research Team (PORT) [14].

Dietary supplements to decrease symptoms of psychosis

Antioxidant vitamins: It is suggested that there is an improvement in free radical formation in schizophrenia and the anti-oxidants benefits to decrease the risk of schizophrenia. Oral supplement of Vitamin C, Vitamin E, with atypical antipsychotic decreases oxidative stress, and enhance brief psychiatric rating scale score [15].

Eicosapentaenoic acid (EPA) omega-3 fish oils: Some researchers reported that people have schizophrenia may asset by a decrease in symptoms, when they take fish oil capsules that are high in the EPA (a type of Omega-3 fatty acid) form of oil).

Glycine: The N-Methyl-D-aspartate (NMDA) receptor has a number of sites that affect its action. There is a binding site within the channel for the dissociative anesthetics such as ketamine and PCP ("angel dust"), which acts as non-competitive antagonists and shows symptoms of schizophrenia. Glycine is act as an agonist for NMDA. It may turn out to be a very helpful supplemental treatment [16].

Optimizing herbal plants having antipsychotic activity

Abizia zygia root extract: V.W.-A. V.W.-A. Kumbol *et al*. suggested that the root extract of Albizia zygia shows an antidopaminergic like activity in mice with potential to reduce symptoms of psychosis. The effects of AZE (30–300 mg kg−1) were evaluated against apomorphine induced cage climbing as well as ketamine induced enhanced immobility, impaired social interaction, new object identification and hyper locomotion. The tendency of AZE to cause catalepsy and to constrict haloperidol produced catalepsy was also studied. AZE 30–300 mg kg−1 significantly reduced apomorphine induced cage climbing as well as ketamine induced enhanced immobility, impaired social interaction, new object identification and hyper locomotion (at least $P < 0.05$). Moreover, the root extract produced no cataleptic effect but significantly reduced haloperidol induced catalepsy at a dose of 30 mg kg−1 ($P < 0.05$) [17].

Viscum album L. (Loranthaceae): G. Gupta *et al*. study suggested that extract of Viscum album L. shows sedative, antiepileptic and antipsychotic effect in albino mice and albino rats. The aqueous leaf extract of plant increases the pentobarbital induced locomotors activity in actophotometer and sleeping time. This study suggested that decreased locomotor activity promote GABAergic neurotransmission. The aqueous extract decreased MES, INH and PTZ-induced convulsions which refers that enhancing the GABAergic system. The leaf extract decreased the apomorphine induced corny behavior and increase the HAL induced catalepsy which shows the extract have antidopaminergic action [18].

Desmodium adscendens: Amoateng *et al*. found that the ethanolic extract of Desmodium adscendens produced neuroleptic like activities in albino mice. Motor side effects are only developing at higher doses of the ethanolic extract. The DAE produced cholinergic, and serotonergic like activity and sedation in mice when studied using the Irwin's test. No mortality was observed after 24 h post treatment. The LD50 in mice was observed to be greater than 3000 mg/kg. The DAE reduce the frequency of novelty and apomorphine caused rearing and locomotor action in mice. It also reduced the frequency and duration of apomorphine induced locomoter activity in mice. It did not cause any cataleptic effect in mice but only significantly increased haloperidol produced catalepsy at a dose of 1000 mg/kg [19].

Synedrella nodiflora (L) Gaertn: Patrick Amoateng *et al*. studied suggested that the behavioral effects of Synedrella nodiflora L. (100, 300 and 1000 mg/kg) pre-treated mice were tested in the forced swimming (FST) and tail suspension (TST) tests. Behavioral events such as immobility, mobility, were tested. The possible entanglement of monoamines in the effects of Synedrella nodiflora L. was delayed in the TST by pre-treating mice with para-chlorophenylalanine (pCPA) and α- methyldopa, reserpine in independent experiments [20].

Lonchocarpus cyanescens: Mubo A. Sonibare *et al*. observed that the ethanolic and aqueous extracts of Lonchocarpus cyanescens shows neuroleptic activity in psychotic rats. The antipsychotic effects of the extracts were studied using the amphetamine model of psychosis in rats. The effect of the extracts on motor activity was also observed in the open field test in mice. The extracts of LC (25–400 mg/kg, i.p.) gradually (p\0.05) inhibit psychotic behavior produced by amphetamine (10.0 mg/kg, i.p.) in rats, which suggest antipsychotic activity. The aqueous extracts (25–400 mg/kg, i.p.) further cause gradually (p\0.05) decrease in psyche motor activity of the rats in the open field test. However, in comparison to chlorpromazine, a typical antipsychotic, the extracts did not produce cataleptic behavior in the animals [21].

Synedrella nodiflora (L) Gaertn: Patrick A *et al*. suggested that the hydroethanolic whole plant extract of Synedrella nodiflora (SNE) have antipsychotic effect. Primary studies observed in animals, SNE gradually decreased stereotypic behaviors suggesting antipsychotic activity. Central nervous system depressant action of SNE, we presumed that it may have benifit in the management of psychosis. The present study results that the antipsychotic

effect of the SNE in several animal models of psychosis. The initial central nervous system antipsychotic, anticonvulsant and sedative activities of SNE (30–3000 mg/kg, p.o) were tested using the Irwin's test, the locomotion, rearing and stereotypy counts produced by SNE (100–1000 mg/kg, p.o) were tested using the open-field paradigm. The antipsychotic animal models used in the study of SNE (100–1000 mg/kg, p.o) apomorphine induced stereotype, rearing, locomotion and pole climbing activities. The effect of SNE to cause catalepsy in animal as well as its action on haloperidol produced catalepsy was slowed. SNE shows cholinergic and serotonergic like activities in the Irwin test, with sedation at potent doses. SNE gradually decreased the frequencies of novelty and apomorphine induced rearing and locomotion [22].

Noni (Morinda citrifolia Linn.): Pandy *et al*. study sugested that of the alcoholic extract of Morinda citrifolia (MMC) at the doses 1, 3, 5, 10 g/kg was given po one hour before apomorphine (5 mg/kg, i.p) and methamphetamine (5 mg/kg, i.p) respectively in Swiss albino mice. On the day of test, an equal average daily divided dose of TNJ was given by po gavage one hour before to apomorphine treatment, after apomorphine/methamphetamine administration, the animals were placed in the cylindrical metal cages and observed for climbing behaviour and climbing time. The acute treatment gradually decreased the apomorphine caused pole climbing behaviour and climbing time in mice. The MMC also gradually reduced methamphetamine caused climbing time and behavior in mice is also dose dependent. The present study results suggested that the neuroleptic effect of Morinda citrifolia Linn. in mice, results that noni has dopaminergic antagonist like activity which can be used in the management of neuropsychiatric disorders [23].

Conclusion

This review suggested that a part from atypical antipsychotic there are various plants which having antipsychotic activity (Albizia zygia root extract, Viscum album L. (Loranthaceae), Desmodium adscendens, Synedrella nodiflora (L) Gaertn, Lonchocarpus cyanescens, Noni (Morinda citrifolia Linn.), these plants are very much use full in the management of schizophrenia. Not only plants there are some other dietary supplements which may be very much use full in the management of psychosis.

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