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## Interventions for Schizophrenia---- An Emerging Mental Disorder

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### Review Article

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#### ABSTRACT

Schizophrenia is a serious mental disorder that affects mainly young people. Abnormalities in brain causes the disease. Environmental and genetic factors play an important role for the spread of the disease. Symptoms include mood disorders, psychological stress and suicidal tendency. Patients affected with this disease (50%) commit suicides. Truly speaking, the disease has no prevention. Diagnosis of the disease can be made by the symptoms. Treatment includes antipsychotic medication which completely cures the disease in 20% of the patients. Cognitive behavioural therapy and rehabilitation centres are emerging now a days which are the hopeful interventions for the treatment of disease. Research is being carried out on the molecular and genetic factors and the major cause of the disease which is unknown till today. The present review focuses on the causes, symptoms, Diagnosis and majorly on the interventions (treatment methods) of Schizophrenia. The main objective is to establish more rehabilitation centres and make psycho-therapy cost effective.

#### INTRODUCTION

The word Schizophrenia is derived from Greek words skhizein means split and phren means mind. Schizophrenia should not be confused with split personality disorder. As it is misinterpreted to Multiple Personality disorder (MPD)<sup>[1-3]</sup>. Schizophrenia is a serious mental disorder that effects on the behavior of a person. People with schizophrenia cannot distinguish the reality and imaginary. They may have difficulty in expressing normal emotions in social situations. One out of hundred is affected with Schizophrenia. It usually starts in early childhood<sup>[4, 6, 7]</sup>. In 2013, more than 13,000 people died of this disorder. The average life expectancy is 10 to 25 years but most patients but most patients commit suicide (more than 5%) [6,8,9,10].The patients with Schizophrenia have additional symptoms like mood disorders, psychological stress and more than 50% patients suffer from substance use disorder. About 2.8 million Americans were affected with this disease<sup>[11-13]</sup>.

#### Structure of Brain

Brain is the major organ in Central Nervous System. Different layers are present in the brain. The first is the cortex. The cortex is the convoluted gray matter around the outside of the brain. It contains the neurons where complex thoughts and ideas come from. The lobes are the four parts of the cortex, The parietal lobe is located on the top of the brain. At the very front of the parietal lobe is the sensory cortex. This is where feelings from all over the body are made sense of<sup>[14, 15]</sup>. The second part, the temporal lobe is located behind your temples. An important feature of this lobe is the superior temporal gyrus which makes sense of what we hear. Inside this lobe is another set of nerve cells that is called the basal ganglia<sup>[14]</sup>. This group of cells has a role in language, memory, and movement. The last lobe is the frontal

lobe<sup>[16,18,19]</sup>. The frontal lobe is located behind your forehead and above your eyes. At the top of the frontal lobe is the supplementary motor cortex that plans out movements of the body<sup>[17, 20]</sup>.

### **Abnormality of Brain in Schizophreniac Patients**

Scientists observed subtle changes in the anatomy of brain of schizophrenic patients. The study found that those with schizophrenia had smaller brain volume, especially in the critical areas involved in thinking, concentration, memory and perception<sup>[21-24]</sup>. The most striking difference was that those with schizophrenia had larger ventricles, cavities within the brain that are filled with the same fluid as in the spine. The fluid bathes the brain, both cushioning it and providing nutrients. Another difference was that the schizophrenic patients had wider cortical sulci, spaces in the folding's at the surface of the cortex<sup>[25, 27, 28, 29]</sup>. They also had a reduction in the size of the left temporal lobe and the front part of the hippocampus, a ridge along each lateral ventricle of the brain. The frontal lobes and hippocampus are crucial to decision making, memory, attention and emotion; schizophrenia involves difficulties with each of these mental functions<sup>[26, 30]</sup>.

### **Causes for Schizophrenia**

The causes for Schizophrenia are not known clearly. The patients however, are affected mainly due to the combination of environmental and genetic factors<sup>[31, 34, 35, 37, 38]</sup>.

#### **Genetic factors of Schizophrenia:**

Schizophrenia is mainly affected genetically. Individuals with this disorder in their parents or siblings have 10% chance of inheriting the disease whereas it is 15 in general population<sup>[32, 33]</sup>. Furthermore, individuals who are genetically predisposed to schizophrenia don't always develop the disease, which shows that biology is not destiny.

#### **Environmental Factors:**

As for the environmental factors involved, more and more research is pointing to stress, either during pregnancy or at a later stage of development<sup>[36, 39]</sup>. High levels of stress are believed to trigger schizophrenia by increasing the body's production of the hormone cortisol. The following environmental factors affect the patients with schizophrenia<sup>[39, 40]</sup>.

- Prenatal exposure to a viral infection
- Low oxygen levels during birth.
- Exposure to a virus during infancy
- Early parental loss or separation
- Physical or sexual abuse in childhood

### **Signs and Symptoms of Schizophrenia**

Schizophrenia includes a wide range of problems including emotional and thinking abilities. Symptoms include:

#### ***Delusions:***

Delusions are nothing but false beliefs rather than reality. Person tends to think as if the thing he imagined really happened to him. It occurs in 4 to 5 people with Schizophrenia<sup>[42-46]</sup>.

#### ***Hallucinations:***

These are involved in seeing or hearing the things or persons who don't exist in reality. They can be of any senses but hearing sense is most common in Schizophreniac patients.

### ***Disorganized Behavior:***

This kind of behaviour is called disorganised or abnormal motor behaviour. The behaviour will be disorganised and the person shows more extreme emotions which cant be expected at certain situations.. ie., childish behaviour at one end and extreme and unpredictable agitation at the other. They cant focus on one thing<sup>[41, 42, 43]</sup>.

### ***Speech Disorganization:***

Thinking and speech are disorganised such that the answers to the questions may be partially or completely unrelated as the patient loses the capacity of understanding and thinking.

### ***Negative Symptoms:***

The negative symptoms include lack of emotions. Person cannot be able to express the negative and positive emotions. The person may have a reduced ability to plan or carry out activities, such as decreased talking and neglect of personal hygiene, or have a loss of interest in everyday activities, social withdrawal or a lack of ability to experience pleasure.

### ***Suicidal thoughts:***

Among people diagnosed with schizophrenia, an estimated 20% to 40% attempt suicide. The most common symptom in Schizophrenia are Suicidal thoughts which are the most dangerous. Suicidal thoughts are mainly related to Family history, Chronic illness, Substance abuse and Agitation. Some research suggests that alcohol abuse is a major risk factor for suicide in the general population, may not always be a clear risk factor for suicide in schizophrenia. Drug abuse, however, has been widely linked to suicide risk in people with schizophrenia. People with schizophrenia are twice as likely to abuse drugs as people in the general population<sup>[47,48]</sup>.

### ***Diagnosis of Schizophrenia:***

There are no diagnostic methods for Schizophrenia. When doctors suspect someone has schizophrenia, they typically ask for medical and psychiatric histories, conduct a physical exam, and run medical and psychological tests.

These may include a lab test called a complete blood count (CBC), other blood tests that may help rule out conditions with similar symptoms, and screening for alcohol and drugs. The doctor may also request imaging studies, such as an MRI or CT scan<sup>[49]</sup>.

A doctor or mental health provider will check mental status by observing appearance and demeanor and asking about thoughts, moods, delusions, hallucinations, substance abuse, and potential for violence or suicide.

## **Prevention of Schizophrenia**

There's no sure way to prevent schizophrenia. However, early treatment may help get symptoms under control before serious complications develop and may help improve the long-term outlook. Sticking with the treatment plan can help prevent relapses or worsening of schizophrenia symptoms. In addition, researchers hope that learning more about risk factors for schizophrenia may lead to earlier diagnosis and treatment.

## **Treatment and Management of Schizophrenia**

Treatment of schizophrenia requires integration of medical, psychological, and psychosocial inputs. Antipsychotic medications (also known as neuroleptic medications or major tranquilizers) diminish the positive symptoms of schizophrenia and prevent relapses. Although treatment is primarily provided on an outpatient basis, patients with schizophrenia may require hospitalization for exacerbation of symptoms caused by noncompliance with pharmacotherapy, substance abuse, adverse effects or toxicity of medications, medical illness, psychosocial stress, or the waxing and waning of the illness itself<sup>[48,49]</sup>. Hospitalizations are usually brief and are typically oriented towards crisis management or symptom stabilization. Treatment of patients with schizophrenia, particularly during a psychotic episode, may raise the issue of informed consent<sup>[47, 48, 49]</sup>.

#### **Other treatment:**

An entirely different kind of treatment for schizophrenia, still in its early stages, is transcranial magnetic stimulation (TMS). TMS involves the electromagnetic induction of an electric field in the brain. Standard TMS affects neurons within 1.5-2 cm from the scalp, and deep TMS can affect cells to a depth of 6 cm. The electric field changes the excitability of the neurons and seems to be safe with few adverse effects. TMS is mostly used for depression. However, early research suggested that TMS may decrease auditory hallucinations and negative symptoms in schizophrenia<sup>[49, 51]</sup>.

#### **Psychological Therapy:**

Psychological therapy plays a vital role in the treatment of schizophrenia. Different treatment methods such as Cognitive Remedial, Behavioral therapy and Social Skills training and rehabilitation centers have been emerged to treat Schizophrenia. More than 20% of patients were treated and observed rapid changes after the psychological therapy. It was observed that the disease is seen majorly in young people and seen very rare seen in the people above 40 years<sup>[50]</sup>.

Family therapy or education, which addresses the whole family system of an individual with a diagnosis of schizophrenia, has been consistently found to be beneficial, at least if the duration of intervention is longer-term. Aside from therapy, the impact of schizophrenia on families and the burden on carers has been recognized, with the increasing availability of self-help books on the subject<sup>[50, 51, 52]</sup>. There is also some evidence for benefits from social skills training, although there have also been significant negative findings. Some studies have explored the possible benefits of music therapy and other creative therapies.

### **Discussion**

As explained, schizophrenia is very disabling. But as research progresses treatment is slowly but surely becoming more and more effective<sup>[52, 53]</sup>. Fewer patients have to be kept in hospitals and damage to the brain is not as severe. In conclusion, though schizophrenia is disabling and sometimes even deadly, modern science has made many medical breakthroughs, and perhaps, if it is even possible, scientists may discover a complete or partial cure. Persons with schizophrenia constitute a highly vulnerable group of patients who need special attention. At present it is pertinent to evaluate why they are vulnerable to physical diseases and what we can do to improve their life expectancy.

### **Recent Advances**

Though gender does not affect your chances of being born with schizophrenia, it does affect the effects of the disease. Studies have shown that the disease is less severe in women. Researchers have found that women have fewer and lesser symptoms, and later onset<sup>[51-54]</sup>. Some scientists believe that this is because women have estrogen. Research on the effects of estrogen shows that it reduces the effects of dopamine in the central nervous system. If men are given estrogen, their symptoms are decreased, but this is not an effective long-term solution, because it leads to feminization of the men<sup>[54]</sup>.

Scientists have done a recent study on the loss of gray matter in the schizophrenic brain of males over time. They tested two groups of men, one group with and one group without schizophrenia, over intervals of four years. The schizophrenic group lost on average 3% of gray matter per year, compared to less than 1% for the control group. Another study using MRI scans on two groups of male adolescents found that the gray matter loss starts in the parietal lobe. It then spreads to the sensory cortex and the supplementary motor cortex, in the frontal lobes, as well as the parts of the temporal lobes. It continues to progress to the prefrontal dorsolateral cortex and the superior temporal gyri<sup>[51-53]</sup>. The superior temporal gyri is the most important part of the brain for making sense of what we hear<sup>[52]</sup>.

### Future prospects

It's been more than a decade that the research is going on Schizophrenia. Studies should be carried out on molecular and genetic areas. However, methodological uncertainties remain with regard to validating environmental exposures and the population risk conferred by the molecular genetic variants identified to date remains small<sup>[54]</sup>. Not only cross-discipline, but also large-scale cross-disorder investigations are now required to more fully realize the potential of G × E research ultimately, improving prevention and treatment for, schizophrenia. Future research must also focus on the synergistic effects of combinations of psychological interventions or psychosocial rehabilitation programs<sup>[56]</sup>.

### CONCLUSION

There is no specific conclusion for Schizophrenia. However, there are many unanswered questions. Therefore, it seems essential that future psychotherapy research in schizophrenia will focus on process-outcome relations as well as on cost effectiveness of psychological therapy<sup>[55, 56]</sup>. Otherwise, budgetary constraints may prevent these therapeutic approaches from being implemented into standard mental health care.

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