CHAPTER 13: Schizophrenia and Other Psychotic Disorders

Chapter Summary

Schizophrenia is the most severe form of mental illness. It is characterized by impairments in many domains and affects approximately 1% of the population. Characteristic symptoms of schizophrenia include hallucinations, delusions, disorganized speech, disorganized and catatonic behavior, and negative symptoms.

Most cases of schizophrenia begin in late adolescence or early adulthood. The disorder begins earlier in men than it does in women. Overall, the clinical symptoms of schizophrenia tend to be more severe in men than women. Women also have a better long-term outcome. Genetic factors are clearly implicated in schizophrenia. Having a relative with the disorder significantly raises a person’s risk of developing schizophrenia. Other factors that have been implicated in the development of schizophrenia include prenatal exposure to the influenza virus, early nutritional deficiencies, and perinatal birth complications. Current thinking about schizophrenia emphasizes the interplay between genetic and environmental factors.

Even though schizophrenia begins in early adulthood, researchers believe that it is a neurodevelopmental disorder. A “silent lesion” in the brain is thought to lie dormant until normal developmental changes occur and expose the problems that result from this brain abnormality. Many brain areas are abnormal in schizophrenia, although, abnormalities are not found in all patients. Brain abnormalities that have been found include decreased brain volume, enlarged ventricles, frontal lobe dysfunction, reduced volume of the thalamus, and abnormalities in temporal lobe areas such as the hippocampus. The most important neurotransmitters implicated in schizophrenia are dopamine and glutamate.

Patients with schizophrenia have many problems in aspects of neurocognitive functioning. They show a variety of attentional deficits (e.g., poor P50 suppression and deficits on the Continuous Performance Test). They also show eye-tracking dysfunctions. Patients with schizophrenia are more likely to relapse if their relatives are high in expressed emotion (EE). High EE environments may be stressful to patients and may trigger biological changes that cause dysregulations in the dopamine and glutamate systems. This could lead to a return of symptoms. Interestingly, both being reared in an urban environment and immigration have been shown to increase the risk of schizophrenia perhaps through the effect of stress. For many patients, schizophrenia is a chronic disorder requiring long-term treatment or institutionalization. However, with therapy and medications, about 38% of patients show a reasonable recovery. Only about 16% of patients recover to the extent that they no longer need treatment.

Patients with schizophrenia are usually treated with antipsychotic (neuroleptic) medications. Second-generation antipsychotics cause fewer extrapyramidal (motor abnormality) side effects. Antipsychotic drugs work by blocking dopamine receptors. Overall, patients taking second-generation antipsychotics do better than patients taking conventional antipsychotic drugs. Psychological treatments for patients with schizophrenia include cognitive behavior therapy, social skills training, and other forms of individual treatment as well as case management. In addition, family therapy is also beneficial. Family therapy focuses on reducing EE and provides families with communication skills and other skills that are helpful in managing the illness.

Detailed Outline

I. Schizophrenia
   A. Origins of the Schizophrenia Construct
      1. Haslam, an apothecary at Bethlem Hospital in London, first described schizophrenia in the case of John Tilly Matthews in 1810.
      2. Morel, 50 years later, described a case in a 13-year-old boy; called the condition demence precoce.
      4. Bleuler (1911)—originated the term schizophrenia because he believed the disorder was primarily characterized by a disorganization of thought processes, a lack of coherence between thought and emotion, and an inward orientation away (split off) from reality.

   B. Epidemiology
      (see Figure 13.1 for chart of age of onset)
1. Lifetime prevalence of about 0.7%, 1 out of every 140 people who survive at least to age 55.
2. Higher risk in certain groups: parent with schizophrenia, family with schizophrenia, older father (45–50) at time of birth, having a parent who works as a dry cleaner, people of Afro-Caribbean origins living in the U.K.
3. Vast majority of cases begin in later adolescence or early adulthood 18–30 years of age.
4. Males tend to have an earlier onset, between the ages of 20–24, and a more severe form of the disorder.
5. Brain abnormalities are more severe in men than in women.
6. More common in males, for every three men that have the disorder only two women have the disorder.
7. Estrogen levels explain the delayed onset in females.

II. Clinical Picture
A. Delusions
1. Comes from the Latin verb ludere, which means “to play”; in essence, tricks are played on the mind; occur in 90% of patients at some point in their illness.
2. Delusions are not exclusive to schizophrenia.
3. Certain delusions are common in schizophrenia:
   a. Belief that one’s thoughts, feelings, or actions are being controlled by some outside agent.
   b. Thought broadcasting.
   c. Thought insertion.
   d. Some external agency has robbed one of one’s thoughts (thought withdrawal).
   e. Delusions of reference.
   f. Delusions of bodily changes.

B. Hallucinations
1. Sensory experience in the absence of any external perceptual stimulus.
2. Comes from the Latin verb hallucinere, meaning to wander in mind or idle talk.
3. Auditory are the most common—75% of those with schizophrenia report auditory hallucinations.
4. Imaging studies show that hallucinating patients show increased activity in Broca’s area—area of the temporal lobe involved in speech production; suggests that auditory hallucinations occur when patients misinterpret their own self-generated and verbally mediated thoughts (inner speech or self-talk) as coming from another source.
5. 13.1 The World Around Us: Stress, Caffeine, and Hallucinations.

C. Disorganized Speech and Behavior
1. Person fails to make sense, despite seeming to conform to the semantic and syntactic rules governing verbal communication; has been referred to as “cognitive slippage,” “derailment,” “loosening of associations,” and “incoherence.”
2. Neologisms.
3. Impairment in goal-directed activity; deterioration from a previously mastered standard.
4. Deficits may appear in personal hygiene, disregard for personal safety and health, silliness or unusual dress, or a catatonic stupor.

D. Positive and Negative Symptoms (see Table 13.1 for a list of positive, negative, and disorganized symptoms)
1. Positive vs. negative syndrome schizophrenia; disorganized symptom pattern now recognized.
2. **Disorganized symptom.**
3. Positive symptoms reflect an excess or distortion: delusions, hallucinations.
4. Negative symptoms reflect an absence or deficit: alogia, flat or blunted affect, avolition.
5. Research suggests that even when flat or blunted emotional expressiveness occurs, subjective reports of patients indicate they are experiencing plenty of emotion.
6. **Flat affect**—blunted emotional expression.
7. **Alogia**—little speech.
8. **Avolition**—inability to initiate or persist in goal-directed activities.

E. **Subtypes of Schizophrenia**
   1. Paranoid type
   2. Disorganized type
   3. Catatonic type
   4. No longer included in DSM-5, due to research that did not yield differences in etiology or treatment.

G. **Other Psychotic Disorders**
   1. **Schizoaffective disorder**
      a. Features of schizophrenia and a mood disorder.
      b. In *DSM-5*, changes from *DSM-IV-TR* specify that symptoms must meet criteria for full major mood episode and to be present for more than 50% of the total duration of the illness.
      c. Prognosis better than for schizophrenia.
   2. **Schizophreniform disorder**
      a. Schizophrenia-like psychoses that last at least one month but not as long as six months.
      b. Most often seen in an undifferentiated form.
      c. May or may not be related to subsequent psychiatric disorder.
      d. Prognosis better than for schizophrenia.
   3. **Delusional disorder**
      a. Other than delusions, behave normally.
      b. Interesting subtype is erotomania.
   4. **Brief psychotic disorder**
      a. Sudden onset of psychotic, grossly disorganized, or catatonic symptoms.
      b. Often lasting only days.
      c. Often triggered by stress.

II. **Risk and Causal Factors**

A. **Genetic Factors**
   (see Figure 13.2 for genetic relationship of schizophrenia)
   1. Twin studies
      a. Higher concordance rate for schizophrenia in monozygotic twins.
      b. Torrey—MZ concordance rate is 28% and 6% in DZ.
      c. Suggests that genes play a role but genes are not sufficient for explaining schizophrenia.
      d. Studies of discordant MZ twin pairs reveal that children of the “well” twin are at significantly higher risk of developing schizophrenia.
      e. For first-degree relatives (e.g., parents, siblings, or offspring) of a proband with schizophrenia is about 10%; second-degree relatives who share only 25% of their genes with the proband is 25%, with a lifetime of 3%.
      f. Age-corrected incidence—at 17.4% for the offspring of the MZ twins.
   2. Adoption studies
      a. Twin studies overestimate the importance of genes by confounding environment and genes.
      b. Heston found higher rates of schizophrenia among adopted children of schizophrenic biological parents.
   3. Quality of the adoptive family
      a. Finnish Adoptive Family Study of Schizophrenia
         (1) 21 year follow-up.
         (2) Children of biological parents with schizophrenia developed more schizophrenia and schizophrenia-related disorders than did the controls.
         (3) Combination of genetic risk and high communication deviance was found to be problematic; children with genetic risk but low
communication deviance families were healthier than the control children.

b. Tienari and colleagues—recent evidence of gene-environment interaction; only children with high genetic risk and adverse family environment went on to develop schizophrenia or schizophrenia-related disorders.

4. Molecular genetics
   a. Interested in uncovering the mode of genetic transmission; one method of doing this is through complicated mathematical models called segregation analysis.
   b. Schizophrenia probably involves multiple genes working together.
   c. Specific regions on chromosomes 22, 6, 8, and 1 are being investigated.
   d. By using known genes (DNA markers), can predict where the genes for schizophrenia might be—called linkage analysis.
   e. Currently looking for candidate genes: genes known to be involved in some of the processes that are thought to be problematic in schizophrenia, such as genes involved in dopamine metabolism.

5. Endophenotypes
   a. Endophenotypes are discrete, stable, and measurable traits that are thought to be under genetic control.
   b. It appears as though a cluster of specific symptoms, perceptual aberrations, working memory tasks, and magical ideation may have a predisposition to schizophrenia.

B. Prenatal Exposures
1. Viral infection
   a. In Northern hemisphere, more people with schizophrenia are born between January and March.
   b. 1957 flu epidemic in Finland—elevated rates of schizophrenia in children whose mothers had been in their second trimester.

2. Rhesus incompatibility
   a. Associated with increased risk of schizophrenia.
   b. For males, raises risk of schizophrenia to 2.1%.
   c. Mechanism might involve oxygen deprivation.

3. Pregnancy and birth complications
   a. Birth complications increase risk of schizophrenia.
   b. Specifically, obstetric complications that reduce oxygen flow such as breech delivery, prolonged labor, or the cord around the baby’s neck.

4. Early nutritional deficiency
   a. Dutch Hunger Winter.
   b. Children conceived during the height of the famine had a 2-fold increase in their risk of later developing schizophrenia.
   c. Unclear whether problem is general lack of nutrition or of a specific nutrient.

5. Maternal stress
   a. If a mother experiences intense stress in the first trimester or beginning of the second.
   b. Death of a loved one associated with 67% increased risk for schizophrenia.
   c. Stress hormone passed to the fetus through the placenta.

C. Genes and Environment in Schizophrenia: A Synthesis
1. Focus on MZ twins have caused an overestimate of heritability of schizophrenia; MZ and DZ twins do not have equally similar prenatal environments.

2. 2/3 of MZ embryos are monochorionic (share placenta and blood supply).

3. Greater increase of schizophrenia in MZ twins may be due to greater chance of shared infections in monochorionic environment.

4. Only people who had a parent with schizophrenia and who had birth complications later developed brain abnormalities such as enlarged ventricles; genetic liability predisposes person to suffer more damage from environmental insults (see Figure 13.4).
D. A Neurodevelopmental Perspective

1. Vulnerability to schizophrenia stems from a brain lesion that occurs very early in development, perhaps even before birth; lesion is dormant until normal maturation of the brain shows the problems.

2. Problem may be a result of neuronal migration.

3. Developmental precursors of schizophrenia
   a. Walker—family home movies
      (1) Preschizophrenic children showed more motor abnormalities, including unusual hand movements; less positive facial emotion and more negative facial emotion.
      (2) Differences frequently present by age 2.
   b. High-risk research
      (1) Unique group as 89% of patients with schizophrenia have no first- or second-degrees relatives with schizophrenia.
      (2) Found to exhibit deficits in attention, social competence, and motor abnormalities.
   c. Study of endophenotypes
      (1) Defined as discrete measurable traits that are thought to be linked to specific genes that might be important in schizophrenia.
      (2) One example might be people who score high on perceptual aberrations and magical ideation.

E. Thinking Critically about DSM-5: Attenuated Psychosis Syndrome

1. DSM-5 debate over creating new diagnosis to identify those at risk for developing later psychosis (prodromal or early signs of schizophrenia)

2. Concern over stigma and that majority of high risk people do not develop a psychotic disorder

3. Concern that antipsychotic medication would be prescribed for mild symptoms

4. Included as a provisional diagnosis

F. Structural and Functional Brain Abnormalities

1. Largely unproductive until the development of modern computer-dependent technologies.

2. Neurocognition
   a. 56%–86% of people with schizophrenia show eye-tracking dysfunction (see Figure 13.5).

3. Loss of brain volume
   a. Enlarged brain ventricles; average of 3% reduction in brain volume (see Figure 13.6).
   b. Males more affected than females.
   c. Present only in a minority of those with schizophrenia and not specific to schizophrenia.
   d. Reductions in brain volume (cortical tissue loss) increase over time (see Figure 13.7).

4. Affected brain areas (see Figure 13.8 for a diagram of brain areas of interest in schizophrenics)
   a. Evidence of problems in the frontal and temporal lobes as well as neighboring (medial temporal) areas such as the amygdala, hippocampus, and thalamus.
   b. Not specific to schizophrenia and not all patients with schizophrenia show these differences.
   c. Abnormally low frontal lobe activity (hypofrontality) shown when patients engage in mentally challenging tasks; associated with negative symptoms.
   d. Left temporal lobe abnormalities may be linked with positive symptoms.
   e. Reduced volume of thalamus may prevent filtering out of irrelevant sensory information.

5. Cytoarchitecture
   a. If cells fail to migrate properly, the organizational structure (cytoarchitecture) will be abnormal.
b. Organization could also be disrupted during synaptic pruning and programmed cell death.

c. Documented differences in neurons in prefrontal cortex, cortex, and hippocampus.

d. Inhibitory neurons may also be missing.

6. Brain development in adolescence

a. We have an excess of synapses into adolescence.

b. Pruning can reduce these synapses to decrease neuronal redundancy.

c. Increase in white matter and in the volume of the hippocampus and amygdala.

7. Synthesis

a. Genes create an enhanced susceptibility to potentially aversive environmental events.

b. Unlikely that schizophrenia is the result of any one problem in any one specific region of the brain.

c. Subtle brain abnormalities in some key functional circuits may be involved.

8. Neurochemistry

a. Mental changes associated with LSD prompted interest in biochemical basis of schizophrenia.

b. **Dopamine**—most important neurotransmitter implicated in the development of schizophrenia.

c. Dopamine hypothesis
   (1) Pharmacological action of Thorazine.
   (2) Amphetamine-induced **psychosis**.
   (3) Give patients drugs that increase dopamine may create psychotic symptoms.
   (4) Dates back to 1960s.

d. Dysregulated dopamine may make us pay more attention, and give more significance, to stimuli that are not relevant or important—aberrant salience.

e. Numerous ways a functional excess of dopamine might be created, including receptor supersensitivity.

f. Dopamine cannot be measured directly in the functioning brain; study of metabolite homovanillic acid (HVA).

g. Research has uncovered no strong evidence that patients with schizophrenia are producing more dopamine than controls.

h. Focus on receptor sensitivity; more D2 receptors in the postmortem brains of schizophrenics than controls; drugs used to treat schizophrenia increase postsynaptic receptor supersensitivity.

i. PET scans of those with schizophrenia who have never been treated with neuroleptics are mixed in regards to an increase in D2 receptor sites.

j. **Glutamate**, excitatory neurotransmitter, may be implicated
   (1) PCP and ketamine, blocks glutamate receptors, induces positive and negative symptoms.
   (2) Postmortem brains of patients with schizophrenia have lower levels of glutamate in both the prefrontal cortex and the hippocampus.

G. **Psychosocial and Cultural Factors**

1. Do bad families cause schizophrenia?
   a. Popular theories in the past including “schizophrenogenic mothers” and “double bind” have not been supported by evidence.

b. Adverse family environments and communication deviance probably have little pathological consequence for the child who has no genetic risk for schizophrenia.

2. Families and relapse
   a. Brown—highly emotional family environments might be stressful to patients; went on to develop and refine the concept of **expressed emotion** (EE).

b. EE has three main elements: criticism, hostility, and emotional overinvolvement.

c. EE predicts relapse; lower EE, decreased relapse.
d. Possible that when stressed, cortisol is released that triggers dopamine activity and release of glutamate leading to relapse.

3. Urban living
   a. Being reared in an urban environment increases risk of schizophrenia (2.75 times more likely).
   b. Children who spent the first 15 years of their life living in an urban environment.
   c. Suggests environmental causes of some types of schizophrenia.

4. Immigration
   a. Recent migrants have much higher risk of developing schizophrenia.
   b. First-generation migrants have 2.7 times the risk; second-generation migrants had 4.5 times the risk.
   c. No evidence that this can be explained by cultural misunderstandings.
   d. Migrants with black skin have a much higher risk of developing schizophrenia than do migrants with white skin; suggests that experiences of being discriminated against could lead some migrants to develop a paranoid and suspicious outlook, setting the stage for the development of schizophrenia.
   e. Research has found that healthy people who feel discriminated against are more likely to develop psychotic symptoms than healthy people who do not feel discriminated against.

5. Cannabis use (see Figure 13.10 for diagram of cannabis use and schizophrenia)
   a. People with schizophrenia are more than twice as likely to smoke pot.
   b. A Swedish study found that heavy pot smokers at 18 are more than 6 times more likely to develop schizophrenia 27 years later than those who never smoked.
   c. People with a COMT gene are at an increased risk for developing psychotic symptoms if they smoked pot in adolescence.
   d. The COMT gene is involved in breaking down dopamine and THC is thought to increase the synthesis of dopamine.
   e. The relationship exists; however, the direction of the relationship is in question.

H. A Diathesis-Stress Model of Schizophrenia
   (see Figure 13.12)
   1. Genetic predisposition.
   2. Environmental factors.
   3. Prenatal events.
   4. Brain maturational process.
   5. Stress.

III. Treatment and Outcomes
   A. Clinical Outcome
      1. 15–25 years after developing schizophrenia, about 38% have a favorable outcome; does not mean a return to premorbid functioning.
      2. 16% recover to the extent that they no longer need treatment.
      3. 12% need long-term institutionalization.
      4. 1/3 show signs of continued negative symptoms.
      5. Spontaneous improvements late in life sometimes occur.

B. Pharmacological Approaches
   1. First-generation antipsychotics
      a. Thorazine and Haldol; referred to as neuroleptics.
      b. Antipsychotics.
      c. Neuroleptics.
      d. Block the action of dopamine, primarily by blocking D2 receptors.
      e. Work best for positive symptoms.
      f. Common side effects include drowsiness, dry mouth, weight gain, extrapyramidal side effects (involuntary movement abnormalities such as muscle spasms, rigidity, shaking).
African Americans and other minorities are at increased risk for extrapyramidal side effects.

Tardive dyskinesia involves involuntary movements of the lips and tongue; females more susceptible.

Neuroleptic malignant syndrome involves high fever and extreme muscle rigidity that can be fatal.

2. Second-generation antipsychotics
   a. 1980s—clozapine (Clozaril) was the first; others include Risperdal, Zyprexa, Seroquel, Geodon, and Abilify.
   b. Causes fewer extrapyramidal symptoms.
   c. Decrease both positive and negative symptoms.
   d. Believed to block a wider array of receptors, including D4 receptors.
   e. Side effects include drowsiness, weight gain, diabetes, agranulocytosis (life-threatening drop in white blood cells).

3. Other approaches
4. The patient’s perspective
   a. Not all patients benefit.
   b. Those who do benefit may show only a reduction in symptoms.
   c. Side effects may lead to discontinuation of taking the medication.
   d. Psychological impact of taking these medications.

C. Psychosocial Approaches
   1. Family therapy
      a. Goal is to reduce EE.
      b. Involves education, improving coping and problem-solving skills, enhancing communications skills, and clarifying family communication.
   2. Case management.
   3. Social skills training.
   5. Cognitive-behavioral therapy
      a. Goal is to decrease intensity of positive symptoms, reduce relapse, decrease social disability.
      b. Results are promising.
   6. Individual treatment
      a. Psychodynamic treatments made some patients worse.
      b. Hogarty—personal therapy focused on coping techniques and skills has been very effective in enhancing social adjustment and social role performance.

III. Unresolved Issues: Why are recovery rates in schizophrenia not improving?
   A. Neuroleptic medications have been used to treat schizophrenia since 1955, but why are recovery rates so low?
   B. Antipsychotic medications appear to be effective in the short term for acute symptoms, but seem to be worrisome in the long run.
   C. Standard antipsychotics operate by blocking dopamine receptors in the brain, and the brain compensates by overproducing dopamine receptors.
   D. Research indicates that recovery rates appear to be better for non-medicated patients in the long run (after 4.5 years). Observations of patients in less industrialized countries who are less likely to be maintained on antipsychotic medications are consistent with this finding.
Key Terms

alogia
antipsychotics (neuroleptics)
attributed psychosis syndrome
avolition
brief psychotic disorder
candidate genes
catatonic schizophrenia
cognitive remediation
delusion
delusional disorder
disorganized schizophrenia
disorganized symptoms
dopamine
dopamine
endophenotypes
expressed emotion (EE)

flat affect
glutamate
hallucination
linkage analysis
negative symptoms
paranoid schizophrenia
positive symptoms
prodromal
psychosis
schizoaffective disorder
schizophrenia
schizophreniform disorder