



# UNIT 9

## BRAIN DISORDERS |

### Structure

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9.1 Introduction	Prion diseases
Expected Learning Outcomes	Parkinson's disease
9.2 Overview of Brain Disorders	Amyotrophic lateral sclerosis (ALS)
9.3 Disorders of mood	9.6 Dementia
9.4 Anxiety Disorders	9.7 Summary
9.5 Neurodegenerative Disorders	9.8 Terminal Questions
Schizophrenia	9.9 Answers

### 9.1 INTRODUCTION

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This unit deals with the brain disorders. It discusses mood disorder, the concept of anxiety, followed by types of anxiety and classification of anxiety etc. Then you will learn the physical, psychological and behavioural symptoms of anxiety and the causes thereof. The some common neurological disorders such as Schizophrenia, Alzheimer's disease (AD), Parkinson's disease (PD), Prion disease, Huntington's disease (HD), and Amyotrophic lateral sclerosis (ALS) are also discussed.

### Expected Learning Outcomes

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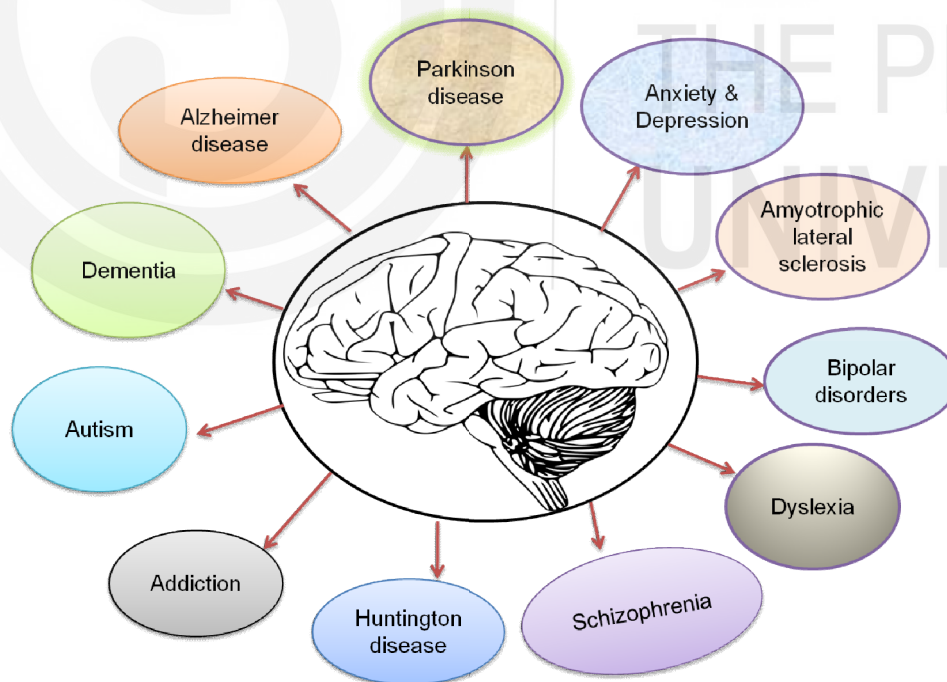
After studying this unit, you should be able to:

- ❖ define mood disorder
- ❖ describe the history of classification of mental disorders; and
- ❖ explain anxiety;
- ❖ understand some common neurological disorders;
- ❖ identify symptoms and causes of neurodegenerative diseases.

## 9.2 OVERVIEW OF BRAIN DISORDERS

Recall the structure and function of the brain from BBCCT-115 course units 13 and 14, Nervous System I and II (Human Physiology). The brain, is the control centre for the whole Central Nervous System (CNS). The brain is composed up of a dense network of nerve cells that is covered by the skull. It is divided into three major sections: the cerebrum, the brainstem, and the cerebellum. It is responsible for the body's intellectual functions, such as processing, integrating, and organising information acquired from the sensory organs. It weighs about 1.4 kg and has 100 billion nerve cells. The cerebrum is linked to the brainstem, which is attached to the spinal cord on the opposite end.

Neurodegenerative diseases are a group of conditions marked by the loss of neurons over time, impairing the function of the central nervous system (CNS) and peripheral nervous system (PNS). These illnesses have an effect on both mental and physical functions of the human body, including movement, speech, memory, IQ, and coordination etc. The common brain disorders are shown in (Fig. 9.1). Alzheimer's disease (AD), Parkinson's disease (PD), Prion disease, Huntington's disease (HD), Spino-Cerebellar Ataxia (SCA), and Spinal Muscular Atrophy (SMA) are some of the most frequent neurodegenerative illnesses. Neuron death has been found in the amygdala, cortex, and hippocampus regions of the brain in Alzheimer's disease, whereas in Parkinson's disease, neuronal death in the substantia nigra pars compacta leads to dopamine insufficiency.



**Fig. 9.1: Neurodegenerative diseases and neuropsychiatric disorders are the two broad groups of human brain illnesses.**

Let us discuss brain disorders:

## 9.3 DISORDERS OF MOOD

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The term 'mood' is commonly used in the English language to imply 'frame of mind', Mood is an internal emotional state that affects a person's behaviour and awareness of the surroundings. Facial expressions reveal affect, which is an outward indication of emotion. Normal, joyful, sad, irritated, worried, and so forth are all possible moods.

The primary disruption in mood disorders is a change in mood or affect, which frequently leads to melancholy or happiness. A change in a person's total activity is followed by a change in their mood. These changes are ubiquitous (affect all parts of a person's life), persistent (last for a long time, generally weeks), and have an impact on a person's personal, biological, and socio-occupational functioning.

According to the Diagnostic and Statistical Manual (DSM-IV-TR) of Mental Disorders, mood disorders are a group of diagnoses in which a disturbance in a person's mood is regarded to be the major underlying characteristic. Mood disorders are emotional disturbances characterised by extended episodes of extreme sorrow, delight, or both. Thus, there may be great sadness, referred to as depression, excessive joy, referred to as mania, or a mix of both, referred to as bipolar illness.

Professionals use the term "mood disorder" to encompass all forms of depression and bipolar disorder. Mood disorders can affect people of all ages. Symptoms in children and adolescents differ from those in adults. Mood problems in children are tougher to identify since they can't always articulate themselves. Mood problems can be treated with therapy, medication, and self-care.

There is one major distinction between mental and physical sickness. Unlike physical disorders, the cause of most mental ailments is unknown. For example, hypertension is a medical ailment caused by high blood pressure due to a variety of factors. Similarly, in acute bronchitis, the bronchi are inflamed for numerous reasons and both ulcerative colitis and bronchial asthma are caused by abnormalities in the colon and lungs. However, modern imaging tests demonstrate that some individuals have abnormalities in specific brain locations, although these are not consistent.

Because mental diseases are caused by psychological disturbances for numerous causes, the word 'disorder' is frequently used instead of 'disease' when referring to them. However, the current categorization systems favour the phrase 'mental disorder', implying a functional abnormality.

There are many various types of mental diseases, each with its own set of symptoms. It is essential to organise them into distinct groups based on predetermined criteria for various objectives. This is accomplished by categorization, which is described as the act of reducing the complexity of occurrences by categorising them according to predetermined criteria. Because the actual aetiology or pathophysiology of most mental problems is unknown, the disorders are classified into several groups based on phenomenological similarities.

## Check List for identifying mood disorders

- depressed condition or feeling blue/down during the day or for the previous two weeks,
- Unable to appreciate the things I used to like.
- Lose of interests in doing daily work in last two weeks.
- sadness or depression feeling accompanied by negative thinking.
- a very high degree of energy, enthusiasm, and a sense of 'High' as 'Very Good' - which is not the person's regular personality

Mood disorders are among the most prevalent mental disorder. They can affect individuals of all ages, socioeconomic statuses, races, castes, religions, and countries. Several studies have been conducted to learn more about the epidemiology of mood disorders both internationally and nationally.

Depressive disorders are more common than bipolar disorders. The lifetime risk (the chance of having an illness throughout one's lifetime) for bipolar disorder is 0.3-1.5 percent, while the risk for depressive disorders is 8-20 percent. Bipolar disorders have a yearly frequency of less than 1% while depressive episodes have a yearly incidence of roughly 2%. Men and women are equally affected by bipolar illness. Women have a twice higher frequency of depressive illnesses than males. The explanation for the greater incidence of depression in women is thought to include hormonal changes, the impact of motherhood, and psychosocial pressures on women.

Bipolar disorder generally occurs between the ages of 18-24 years, with a mean onset age of 21 years, whereas depressive disorder occurs between the ages of 20-50 years, with a mean onset age of 40 years; instances have been observed in both children and the elderly.

People from higher socioeconomic classes have a larger percentage of individuals with bipolar illness. There is no link between socioeconomic status and depressive illnesses. The lifetime risk of dysthymia (moderate depression) is around 3%.

Women, divorced and single people and those with low incomes had greater rates.

Mood disorders include:

- **Depression.** Symptoms of depression include loss of interest in typical activities, sadness or hopelessness, and other symptoms.
- **Dysthymia.** Depressed or angry mood that has lasts 2 years or more.
- **Bipolar.** This is a condition when a person has phases of depression and mania. Mood problem caused by another illness. Cancer, traumas, infections, and chronic diseases can all cause sadness.
- **Substance-induced depression**
- Symptoms of depression caused by drugs, alcohol, poisons, or other medications.

### What causes depression?

Mood disorders have several causes. A chemical imbalance in the brain causes them. Stressful life transitions might also lead to depression. Mood problems run in families.

Symptoms of depression vary depending on age and mood condition. The most frequent signs of a mood disorder are:

- Anxious, melancholy, or “empty” mood
- a sense of helplessness
- poor self-esteem
- Inadequacy or worthlessness
- over-guilty
- desiring to die or trying suicide (Note: This ailment requires immediate treatment!)
- Loss of interest in customary or previously appreciated activities, especially sex
- Issues in marriage
- Insomnia or oversleep
- Appetite or weight changes
- lowered energy
- Inability to focus
- a loss of decision-making abilities
- Chronic physical symptoms (such as headaches, stomach aches, or fatigue) that don't respond to therapy
- Leaving or threatening to leave
- Sensitive to rejection or failure
- Anger, irritability, or antagonism

Mood disorders cause these sensations to be more powerful than normal. Anxiety and depression might interfere with one's interest in family, friends, community, or career. Suicidal ideas should be treated immediately.

Mood disorder symptoms might mimic other illnesses or mental health issues. Always consult a doctor for a diagnosis.

### Genetic factors

It has been shown via a number of family, adoption, and twin studies that mental disorders are inherited. People with a close family member who suffers from a mood disorder have a higher risk of developing the condition themselves. Children are at increased risk when family members are afflicted with mood disorders. There is a 10% to 25% chance of a child developing a mood disorder if one or both parents suffer from a mental illness. It has been shown that 70-90% of people with mood disorders had a non-identical and identical twin, respectively, according to twin studies.

Neurotransmitters like serotonin, nor-epinephrine, dopamine, and histamine have been found to change in the brains of patients with mood disorders, such as depression, where norepinephrine, serotonin, and dopamine activity decreases, and, norepinephrine, serotonin, and dopamine activity increases in mania. Serotonin metabolite concentrations in cerebral fluid have been shown to be low in certain individuals with suicidal thoughts. By modulating these neurotransmitters, mood-altering medicines might help alleviate symptoms. Psychosomatic illness is linked to hyperactive hypothalamo-pituitary axis activity. Mood problems have been linked to changes in thyroid hormones.

### **Social factor**

It has been noticed that stressful life events such as job loss, death of a loved one, etc. occur more often prior to the commencement of a mood disorder. The most strong indicators of the development of a depressive state are recent stressful experiences. According to the cognitive theory of depression, distinct cognitive distortions (cognitive triad - a negative attitude toward oneself, one's surroundings, and one's future) result in depression in vulnerable individuals.

## **9.4 ANXIETY DISORDERS**

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Anxiety is a term that refers to a feeling of anxiety, apprehension, trepidation, or concern. In truth, everyone experiences anxiety when confronted with a problem or a task that threatens one's value and self-esteem; in such situations, anxiety is genuine and useful since it motivates the individual to achieve the objective within a realistic timescale. However, anxiety becomes a disorder when it occurs without a clear reason or when the intensity of the concern is out of proportion to the scale of the issue, real or imagined. Free-floating anxiety occurs when anxiety is widespread and without a clear cause. These illnesses have an impact on how we feel and act, and they may cause physical symptoms. Mild anxiety is vague and disturbing, however severe anxiety may be crippling and have a significant impact on one's everyday life.

Almost everyone gets worried or frightened before an exam or an important business meeting in daily life. Even the wealthy, the poor, the renowned, and the general public suffer from anxiety in the form of anxieties and fears. Anxiety disorders are a broad phrase that encompasses pathological dread and anxiety. At the latter end of the nineteenth century, these phrases became increasingly common in psychiatry. Anxiety disorders as a phrase was coined during Sigmund Freud's lifetime. Anxiety, according to Freud and his followers, is a warning signal that endangers or threatens unpleasant id impulses that are also against societal standards and are ready to reach the conscious mind. Anxiety, according to Freud, may be adaptive if the discomfort it causes drives individuals to find new approaches to life's obstacles.

Anxious people are unaware of the causes of their anxiety. Despite the fact that fear and anxiety have comparable symptoms, the source of concern is obvious. Human life depends on fear and stress responses. They allow individuals to achieve significant objectives and react correctly in the face of danger. A true danger or challenge triggers the stress reaction (fight, fright, or flight) in a healthy person, which is then employed as a catalyst for proper action.

An anxiety disorder, on the other hand, is characterised by an excessive or inappropriate level of arousal, which is accompanied by emotions of dread, uncertainty, or terror. The term anxiety comes from the Latin word *angere*, which means "to choke" or "to strangle." Anxiety is often elicited by situations that aren't really dangerous. Nonetheless, it has the potential to stun a person into passivity or seclusion. When a danger is eliminated, an anxiety disorder lingers, but a healthy reaction to a threat dissolves.

It is common to feel anxious when confronted with stress or frightening events, but it is unusual to experience severe, continuous anxiety without an obvious reason. Most persons with anxiety disorders are highly sensitive to danger signals, exhibiting heightened sensitivity, alertness, or readiness to respond to prospective threats, according to emerging data. Dementia is a collective term used to describe the symptoms of neurodegenerative disorders. Late-stage neurodegenerative disorders cause major cognitive dysfunctions that disrupt daily living. Dementia causes memory and learning difficulties, visual impairment, loss of attentive function, and behavioural abnormalities.

Anxiety neurosis or anxiety states were once used to describe generalised anxiety disorder (GAD). The disorder is more commonly seen in general care settings or internal medicine clinics than in psychiatric facilities. GAD is characterised by unreasonable and/or excessive anxiety that is generalised and persistent, occurs at all times, and is not limited to specific circumstances or items.

Females are twice as likely as men to suffer from the illness, which has a frequency of 2-5 percent. The disease commonly begins in one's twenties, although it may strike anybody at any age.

**The symptoms of anxiety are:**

- Nervousness
- Feeling faint
- Lack of concentration
- Trembling or shaking
- Feeling dizzy
- Vigilance
- Sleeplessness
- Breathlessness
- Worry or apprehension
- Sweating
- Feeling of choking
- Shortness of breath
- Nausea
- Fear of dying

**Category of Anxiety Disorders**

i) **Generalised Anxiety Disorders:** This is characterised by more persistent, vague, inexplicable, yet overwhelming worries that do not appear to be linked to anything specific. It has the appearance of reasonable anxieties, but in the majority of cases, there is no genuine danger. Generalized anxiety disorder is diagnosed when a person has had continuous and excessive concern for six months or longer. There are four kinds of symptoms associated with this condition, which may be experienced separately or in combination.

ii) **Panic Disorder:** Panic Disorders may strike without notice. The symptoms are comparable to those of generalised anxiety disorders, with the exception that they are more severe and frequently appear suddenly. Shortness of breath, elevated heart rate, dizziness, and a sense of powerlessness are all symptoms of panic attacks. The sufferers are afraid of dying, going insane, or doing something uncontrollable, and they exhibit a wide range of strange psychosensory symptoms. Women are more affected than males, and younger age groups are more affected than the elderly.

These outbursts may last anywhere from a few seconds to many hours or even days. They also vary in terms of severity and degree of incapacity.

iii) **Obsessive-Compulsive Disorder (OCD):** According to the Diagnostic and Statistical Manual of Mental Disorders (Text Revision)(DSMIV(TR)), obsessive-compulsive disorder (OCD) requires the presence of either obsessions or compulsions. Obsessive-compulsive disorder affects the majority of individuals. The driven character of thoughts and rituals found in patients with this disease is primarily conveyed by this disorder. Obsessions are repeated ideas, urges, or visions that a person tries to get rid of or reject but can't or has a hard time doing so. The person lacks control over their obsessions, which increases anxiety and leads to the strategy most often employed to attempt to manage the obsessions. Doubt, hesitancy, fear of infection, or dread of one's own violence are common. Obsessions are usually suppressed by compulsions, which are thoughts or actions that bring relief.

iv) **Phobias:** The name "phobia" comes from the Greek word "phobos." It's an illogical, long-lasting fear of specific circumstances, actions, or objects. Except for their phobias of particular things, phobic circumstances, persons, and so on, people with this illness have a clear understanding of what they are scared of. Physically, they seem to be in good health, but their concerns, which are out of proportion to reality, are incomprehensible and beyond their will full control. The presence of the feared item or circumstance is not required for phobics to feel acute tension and discomfort. It has a tendency to widen with time. Phobias may begin as a generalised anxiety attack, but with time the worry crystallises around a specific item or scenario/situation.

### Causes of Anxiety Disorders

Anxiety disorders are caused by a combination of medical and psychological variables that are unknown. Because anxiety problems run in certain families, genetics is likely to have a role. On a psychological level, anxiety is considered a reaction to environmental pressures such as the end of an important relationship or exposure to a life-threatening calamity.

An anxiety disorder may develop when a person's reaction to stress is incorrect or when they are overwhelmed by situations. Speaking in front of a group, for example, might be thrilling for some individuals. Others, on the other hand, dread it, exhibiting signs such as perspiration, panic, a racing heart, and, in some instances, tremors.

Even in a small gathering, such persons may avoid speaking. A physical ailment or the usage of medication may also create anxiety problems. Overactive thyroid or adrenal gland, for example, may produce anxiety, as can a pheochromocytoma tumour. Excessive use of corticosteroids, cocaine, amphetamines, ephedrine, and even caffeine can cause anxiety.

Withdrawing from alcohol or some sedatives may also trigger anxiety symptoms. Even though the exact cause of many anxiety problems is uncertain, dementia may be the most common cause of anxiety among elderly.

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### SAQ 1

#### Fill in the blanks:

- i) Neurodegenerative diseases are a group of conditions marked by the loss of ..... over time.
- ii) Excessive use of corticosteroids, cocaine, amphetamines, ephedrine, and even caffeine can cause .....
- iii) ..... is a condition when a person has phases of depression and mania.

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## 9.5 NEURODEGENERATIVE DISORDERS

Neurodegenerative disorders are a group of conditions defined by gradual loss of neurons, affecting both the CNS and the PNS. These disorders affect both mental and physical functions of the body such as movement, speech, memory, IQ, and coordination. Because the symptoms are so similar, the reasons remain unknown. Alzheimer's disease (AD), Parkinson's disease (PD), Prion disease, Huntington's disease (HD), Spino-Cerebellar Ataxia (SCA), and Spinal Muscular Atrophy are some common neurodegenerative illnesses.

### **9.5.1 Schizophrenia**

Schizophrenia is also known as split personality disorder. It is a persistent, chronic, and severe mental disorder that affects roughly 2% of the population. It is a psychotic mental disease with behaviour and social abnormalities.

The initial sign of schizophrenia appears as confusing or even alarming mental abnormalities. This disorder has important symptoms such as disorganized speech, inflexible or lax behaviour, dramatically diminished suitable behaviours or sentiments, as well as the development of delusions.

Schizophrenia is a kind of psychotic condition that interferes with thinking and mental or emotional reactivity, causing the whole personality to collapse. Delusions are false beliefs, such as believing that someone is trying to murder him while, in fact, no such person exists. As a result, it is a fallacy. On the other hand, the individual thought it to be so true that he couldn't tell the difference between what was genuine and what wasn't. As a result of his delusions, his behaviour becomes quite weird.

Schizophrenia is marked by both positive and negative symptoms. Positive symptoms include hallucinations, voices that talk to or about the patient, and delusions that make the patient feel bad. Among the negative symptoms are a flattened sense of pleasure, no desire or will to do anything, and a lack of social interaction. Both types of symptoms have an effect on patients' families, so it is important for doctors to give advice to everyone who is affected by the disease. It is typically accompanied by severe suffering and impairment in a variety of essential aspects of one's life, including personal, familial, social, educational, occupational, and other endeavours. People suffering from schizophrenia are two to three times more likely than the average population to die prematurely. Physical ailments, such as cardiovascular, metabolic, and viral diseases, are often responsible for this.

It causes psychosis and is a very serious condition that can cause a lot of problems in all parts of a person's life, including their personal, family, social, educational, and work lives. Suicide attempts are 50 times more likely among people with schizophrenia than in the general population. Suicide is a severe concern for persons with schizophrenia. Suicide is the leading cause of premature death among persons suffering with schizophrenia, with an estimated 10% to 13% committing suicide and around 40% attempting suicide at least once (and up to 60% of men attempting suicide). The most common causes are severe depression and psychoses that might develop as a consequence of a lack of therapy. When compared to the overall population, which is roughly 0.01 percent, these suicide rates are rather high.

People with schizophrenia are often stigmatised, discriminated against, and have their rights violated. In the world, more than two out of three people who have psychosis don't get the help they need from specialists in mental health care.

#### **Causes**

- Family history of schizophrenia
- Exposure to viruses while in the womb

- Poor nutrition while in the womb
- Stressful life events
- Older paternal age
- Addiction of psychoactive drugs during adolescence

There is no one aetiology of schizophrenia, according to research. Schizophrenia is considered to be caused by a combination of genes and a variety of environmental circumstances. Genetics, early environment, neurobiology, psychology, and social processes all seem to have a role in the disorder's development. Although no one cause of schizophrenia has been established in all those who have been diagnosed with the disorder. Recently, researchers and physicians have concluded that it is caused by a combination of brain vulnerabilities and life experiences.

### **9.5.2 Alzheimer's Disease**

Alzheimer's disease (AD) is the most common and mostly affects those over the age of 60. German physician Alois Alzheimer reported this disease in 1906 based on the medical case of Auguste D, a patient who had memory loss as well as other psychological disturbances such as mood swings and unresponsive conduct. Progressive memory loss and cognitive deficits characterise AD. The illness is caused mostly by two proteins: beta-amyloid and tau protein, both of which accumulate in large amounts in the brain. Both proteins have been linked to neuron degeneration. The appearance of extracellular amyloid plaques and the creation of intracellular neurofibrillary tangles are pathological hallmarks of AD, which contribute to synaptic dysfunction, neuronal death, and brain shrinkage.

### **9.5.3 Prion Disease**

Prion illness was first described as a human neurological ailment by neurologists, Hans Gerhard Creutzfeldt and Alfons Maria Jakob in 1920. Prion disease, commonly known as Transmissible Spongiform Encephalopathies (TSEs), is a rare kind of progressive neurodegenerative disease that affects both humans and animals. A normal cell surface glycoprotein, Cellular Prion Protein (PrPC) is transformed into a conformationally altered isoform (PrPSc) in this disorder. The neurological disease is caused by PrPSc. Creutzfeldt-Jakob Disease (CJD) and bovine spongiform encephalopathy (BSE or 'mad cow' disease) are the two most frequent forms of prion disease that impact humans. Prions are misfolded proteins with the ability to multiply and pass their misfolded structure to normal protein variants

### **9.5.4 Parkinson's Disease**

After Alzheimer's disease, Parkinson's disease (PD) is the most prevalent neurodegenerative illness. It is a progressive brain disorder that mostly impairs bodily mobility. It has an impact on both motor and non-motor processes. The origins of Parkinson's disease are unclear, although hereditary and environmental variables are thought to have a role in the illness's development. Dr. James Parkinson (1817) mentioned it in his book "An Essay

on the Shaking Palsy". The substantia nigra pars compacta of the midbrain is characterised by the loss of dopaminergic neurons and the formation of Lewy bodies. The most prevalent clinical symptoms include; rigidity, akinesia, tremors, postural instability, and non-motor.

### Causative factor

A pathologic characteristic of PD is the degradation of dopaminergic neurons in the substantia nigra pars compacta (SNcp). Dopamine is a neurotransmitter involved in balance, stride, and movement, and its degeneration from nigral projections causes motor problems. Excessive oxidative stress, free radical build-up, environmental pollutants, and genetic abnormalities may all cause dopamine deficiency. Lewy bodies (LBs) made composed of  $\alpha$ -synuclein that gets misfolded and accumulates in many bodily systems of Parkinson's patients have been recognised as two significant pathogenic processes in this illness. The striatum's cortical stimulation of striatal neurons is decreased by dopamine acting in an indirect manner. Parkinsonism's impairment of dopaminergic neurotransmission may have an influence on increasing corticostriatal glutamatergic transmission in the body's physiological condition.

### Genetic factor

Although the actual aetiology of Parkinson's disease is unknown, both hereditary and environmental variables play a significant influence in the disease's development. Parkin (PARK2), PINK1 (PARK6), and DJ-1 (PARK7) gene mutations have been linked to Parkinson's disease. Environmental toxins such as rotenone, 6-OHDA (6-hydroxydopamine), MPTP (1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine) and paraquat act on the mitochondrial complex and inhibit ATP production, resulting in neurodegeneration (**Fig. 9.1**).

Although the degree of heredity is debatable, a family history is undeniably linked to this disorder. Physical inactivity, smoking, coffee and/or alcohol use, and serum uric acid levels have been linked to PD.

### Role of oxidative stress in Parkinson's disease

As a consequence of cellular respiration, reactive oxygen species (ROS) such as hydrogen peroxide ( $H_2O_2$ ), superoxide anion ( $O_2^-$ ), hydroxyl free radical (OH), and peroxynitrite ( $ONOO^-$ ) are formed in the mitochondria. Increased levels of ROS are considered to have a role in the genesis of Parkinson's disease. Mitochondrial ROS has a role in cell death and the development of neurodegenerative disorders. Apoptosis is activated by oxidative stress, and inhibition of complex- I in the substantia nigra serves as a key location for ROS generation. Increased ROS production depletes the mitochondrial defense mechanism, resulting in neuronal death and Parkinson's disease.

### Symptoms

**Anxiety** is a common early sign of Parkinson's disease, and it often occurs in conjunction with sadness and motor irregularities. Anxiety may react to dopaminergic treatment in some individuals while remaining resistant to dopaminergic treatment in others, regardless of dopaminergic status.

## Depression

Around 45 percent of Parkinson's patients suffer from depression. The monoamine hypothesis posits that decreased levels of serotonin, dopamine and norepinephrine (NE) have a role in the pathophysiology of depression.

Instability, postural abnormalities, and resting tremors are symptoms. Early motor symptoms include limb pain, stiffness or numbness, bradykinesia, tremors, a loss of facial expressions, and hypophonia.

**Insomnia** affects more than half of Parkinson's sufferers. Sleep disturbances, both diurnal and nocturnal, are commonly linked to Parkinson's disease. As the disease progresses, insomnia becomes increasingly common.

## Treatment

Since Parkinson's disease is a frequent movement problem found in neurology, but it's difficult to diagnose and treat. Because PD patients have a wide range of motor and non-motor symptoms, the diagnosis is clinical and may be challenging. The medical care of Parkinson's disease patients is tough due to a lack of pharmacological options and the use of levodopa as the backbone of therapy.

## Anxiety in PD

Anxiety is a common early sign of Parkinson's disease, and it often occurs in conjunction with sadness and motor irregularities. Anxiety can respond to dopaminergic treatment in some people while remaining resistant in others, regardless of their dopaminergic status.

## Amyotrophic lateral sclerosis (ALS)

Amyotrophic lateral sclerosis (ALS), also known as amyotrophic lateral sclerosis (a-my-o-TROE-fik LAT-ur-ul skluh-ROE-sis), is a degenerative nervous system illness that affects nerve cells in the brain and spinal cord, resulting in muscular control loss.

The illness is also known as Lou Gehrig's sickness, after the baseball player who was diagnosed with it. Doctors are frequently baffled as to why ALS develops. Some cases are passed down from generation to generation.

Muscle twitching and weakening in a limb, as well as slurred speech, are common symptoms of ALS. ALS eventually destroys the muscles that allow you to move, speak, eat, and breathe. This deadly condition has no known cure.

## Causes

ALS affects motor neuron function and impairs voluntary muscular actions such as walking and speech. The explanation behind this is that ALS causes motor neurons in the brain to deteriorate and eventually die. Motor neurons connect the brain to the spinal cord, which then connects to muscles all over the body. When motor neurons are damaged, they stop transmitting messages to the muscles, making them unable to function.

ALS is hereditary in 5% to 10% of the population. The reason of the rest is unknown.

### Symptoms and signs

ALS usually starts with muscular weakness, which then spreads and worsens as the illness progresses. The common symptoms and signs can vary from person to person, depending on which neurons are damaged. Chewing, swallowing, speaking, and breathing are all affected as a result of this. The following are possible signs and symptoms:

- Difficulty in walking or carrying out typical everyday tasks
- Falling and tripping
- muscular weakness
- Hand clumsiness or weakness
- Slurred speech or swallowing difficulties
- Arm, shoulder, and tongue muscle cramps and twitching
- Crying, laughing, or yawning in an inappropriate manner
- Changes in cognition and behaviour

The risk factors for ALS include: Heredity, age and genetics change

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### SAQ 2

#### True or False:

- ALS affects sensory neuron function and impairs in voluntary muscular actions. [     ]
- A pathologic characteristic of PD is the degradation of dopaminergic neurons. [     ]
- Parkinson's disease caused by accumulation of two proteins: beta-amyloid and tau protein. [     ]
- The appearance of extracellular amyloid plaques and intracellular neurofibrillary tangles are pathological hallmarks of Alzheimer's disease. [     ]

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## 9.6 DEMENTIA

Dementia is the most common mental condition caused by neurologic disease, affecting 1-2% of people in their 60s and 80s. Difficulties with memory and other cognitive and functioning skills are common in dementing disorders. Memory loss and other cognitive impairments may develop the dementia which causes confusion, disoriented, and unable to communicate properly as well as difficulty to recall daily things.

According to the DSM IV categorization, dementia is divided into following categories. These are: a) Dementia, which is linked to main dementing disease, trauma, infections, intoxication, and other factors; b) Amnestic Disorder, characterized by problems with memory function and c) Unspecified Dementia in which person's capacity to think, remember, learn, make decisions, and solve problems is impaired.

### **Type of Dementia**

- i) Primary Dementia
  - Dementia of the Alzheimer's Type, With Early Onset
  - Dementia of the Alzheimer's Type, With Late Onset
- ii) Vascular Dementia
  - Dementia due to HIV Disease
  - Dementia due to Head Trauma
  - Dementia due to Parkinson's Disease
  - Dementia due to Huntington's Disease
  - Dementia due to Pick's Disease
  - Dementia due to Creutzfeldt-Jakob Disease
  - Dementia due to the General Medical Conditions
- iii) Amnestic Disorders
  - Amnestic disorder due to the general medical conditions
  - Substance-Induced Persisting Amnestic Disorder
- iv) Unspecified Dementia's

Although the spectrum of psychopathological manifestations of dementia described above is broad. However, they can be granted into two main categories.

a. Dementia's of Alzheimer's Type

b. Dementia's due to other causes

### **DEMENTIA OF ALZHEIMER'S TYPE**

Alzheimer's disease is a primary degenerative brain illness with distinct neuropathological and neurochemical symptoms of uncertain genesis. The illness normally begins slowly but progressively over a period of years and is subtle in its development. This time span might be very brief or very lengthy. The onset may occur at any age, although it is more common in later life. Early-onset dementia is more likely to have a family history of comparable dementia, a faster course, and more prominent signs of parietal or temporal lobe impairment, such as aphasia or dyspraxia. The progress of late-onset Alzheimer's disease is slower, and cognitive deterioration is more noticeable.

While diagnosing dementia at an advanced stage is not difficult, diagnosing it in its early stages requires substantial ability. It's easy to mistake it with pseudodementia (depression that looks like dementia) in the early stages, and it's also important to distinguish it from normal ageing. Delirium is a third significant differential diagnosis. Let's take a look at three different diagnoses one at a time.

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### SAQ 3

Enlist the types of dementia.

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## 9.7 SUMMARY

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So far, you have studied that:

- The concepts of mood disorder, distinct forms of anxiety and the physical and psychological symptoms of anxiety in this unit. Then we define neurological disorders, highlight its distinguishing characteristics, and examine its implications.
- Mood is a persistent emotional state that is felt inwardly and has an effect on a person's behaviour and perception of the environment. Affect is a similar word that refers to the outward display of emotion as expressed via facial expressions.
- Mood disorders are defined as a chronic and pervasive change in mood or affect that is followed by a change in a person's overall activity and that affects a person's psychological, biological, and socio-occupational functioning.
- Dementia is a collection of brain illnesses that cause the loss of mental skills such as memory and other intellectual and functional abilities over time. Dementia may be caused by more than 70 distinct illnesses. There is no particular aetiology or pathologic process implied by the word. Memory, attention, and orientation problems are common symptoms, as are personality and everyday life changes.
- Alzheimer's disease is the most frequent kind of dementia. We don't know what's causing it. It's a hidden, slow-moving sickness. So yet, there is no particular therapy or medicine for it.
- Parkinson's disease (PD) is the progressive brain disorder that mostly affects the motor and non-motor neuron system. It is characterised by the loss of dopaminergic neurons and the formation of Lewy bodies.
- Amyotrophic lateral sclerosis (ALS), also known as amyotrophic lateral sclerosis is a muscular control loss disorder which affects central nervous system.

## 9.8 TERMINAL QUESTIONS

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1. Discuss mood disorders.
2. Describe anxiety with its symptoms.

3. Explain in detail causes and symptoms of the following:
- Schizophrenia
  - Alzheimer's disease (AD)
  - Parkinson's disease (PD)
  - Prion disease,
  - Huntington's disease (HD)
  - Amyotrophic lateral sclerosis (ALS)

## 9.9 ANSWER

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### Self Assessment Questions

1. i) Neurons  
ii) Anxiety  
iii) Bipolar
2. i) False  
ii) True  
iii) False  
iv) True
3. i) Primary Dementia  
ii) Vascular Dementia  
iii) Amnesic Disorders  
iv) Unspecified Dementia's

### Terminal Questions

1. Refer to Section 9.3.
2. Refer to Section 9.4.
3. Refer to Section 9.5.