Theories in mental health nursing

Theory Definitions:

- Theory: is a supposition or system ideas that is proposed to explain a given phenomenon.
- Concepts : building blocks of theories
- Framework**:** is a group of related ideas , statements or concepts

Components of a theory

- Concepts – ideas and mental images that help to describe phenomena
- Definitions – convey the general meaning of the concepts
- Assumptions – statements that describe concepts
- Phenomenon – aspect of reality that can be consciously sensed or experienced.

Theories in mental illness

Many theories attempt to explain human behavior, health, and mental illness. Each theory suggests how normal development occurs based on the theorist's beliefs, assumptions, and view of the world. These theories suggest strategies that the clinician can use to work with clients. The theories in mental illness divided to tow main part:

- Neurobiological theories
- psychosocial theories
  a. Psychoanalytic
  b. Developmental
  c. Interpersonal
  d. Humanistic
  e. Behavioral

1.Neurobiological theories

The psychiatric mental health nurse must have a basic understanding of how the brain functions and of the current theories regarding mental illness, Approximately 100 billion brain cells form groups of neurons, or nerve cells, that are arranged in networks.

- a synapse is a structure that permits a neuron to pass an electrical or chemical signal to another neuron.
- These neurons communicate information with one another cell
- Neurotransmitters: are the chemical substances manufactured in the neuron that aid in the transmission of information throughout the body.
- Major neurotransmitters have been found to play a role in psychiatric illnesses as well as actions and side effects of psychotropic drugs

THE NERVOUS SYSTEM AND HOW IT WORKS

Central Nervous System

The CNS comprises the brain, the spinal cord, and associated nerves that control voluntary acts. Structurally, the brain consists of the cerebrum, cerebellum, brain stem, and limbic system.

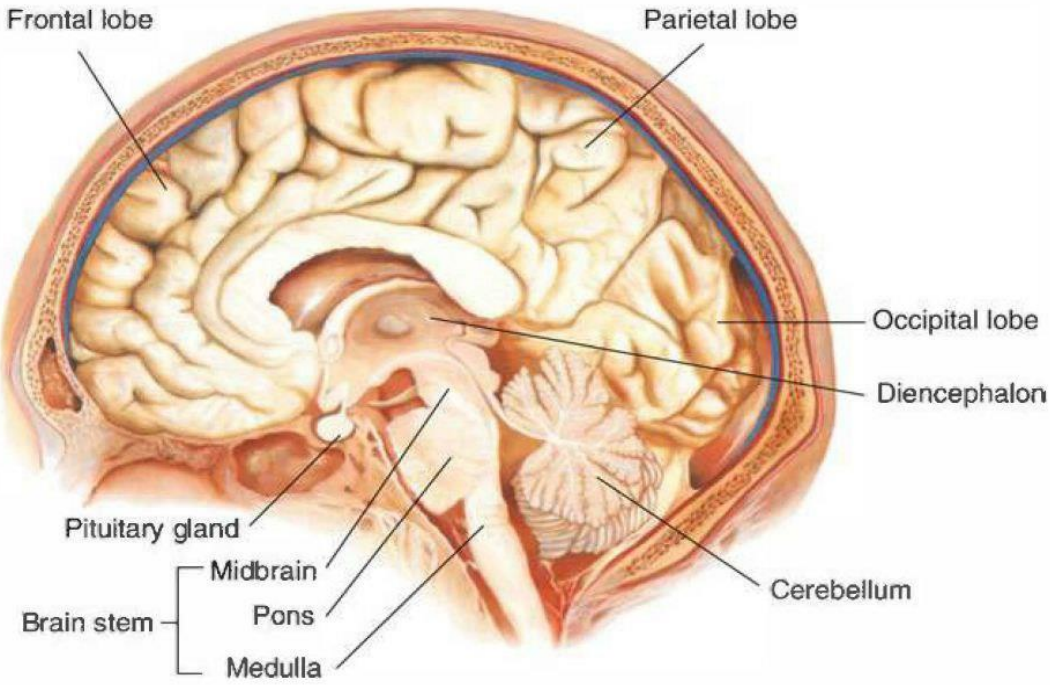
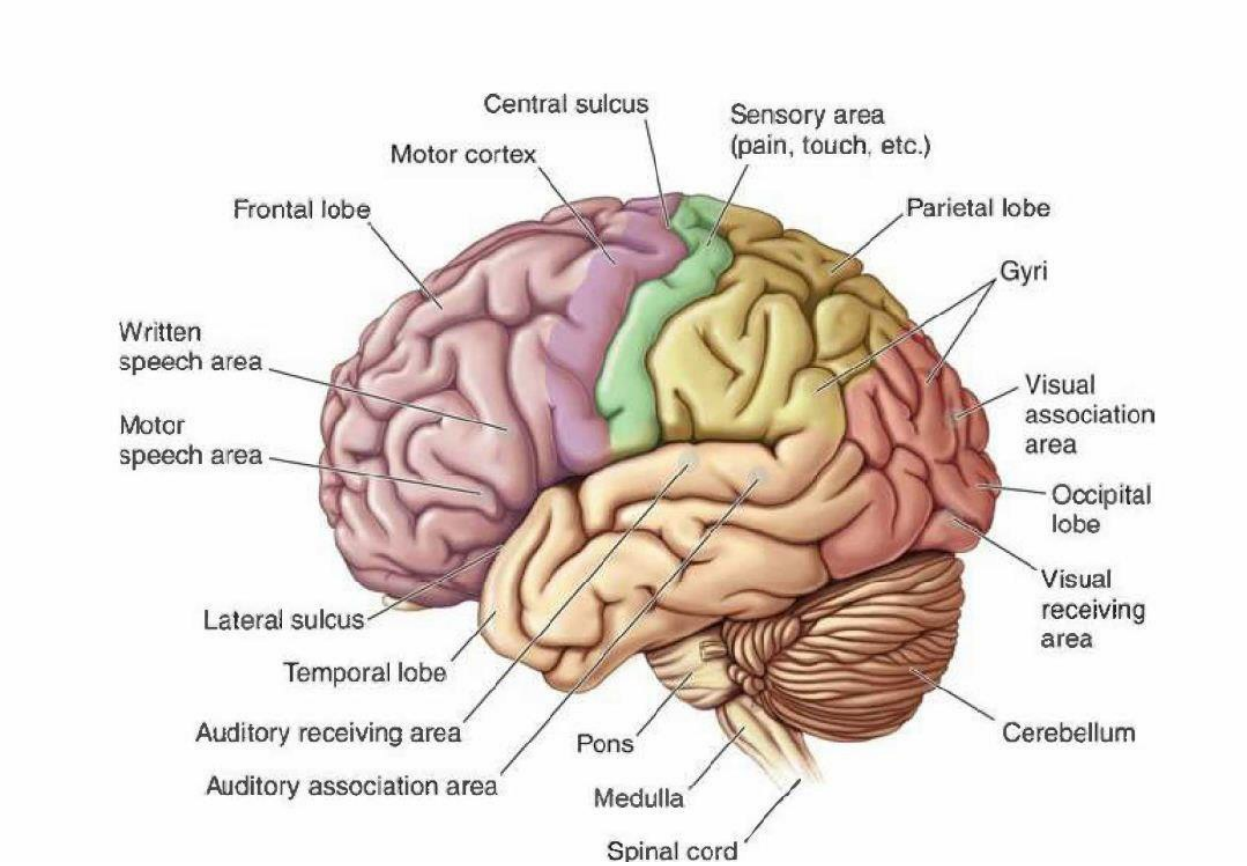


FIGURE 2.1. Anatomy of the brain.



Cerebrum

The cerebrum is divided into two hemispheres; all lobes and structures are found in both halves except for the pineal body, or gland, which is located between the hemispheres. The pineal body is an endocrine gland that influences the activities of the pituitary gland, islets of Langerhans, parathyroid, adrenals, and gonads. The corpus callosum is a pathway connecting the two hemispheres and coordinating their functions. The left hemisphere controls the right side of the body and is the center for logical reasoning and analytic functions such as reading, writing, and

mathematical tasks. The right hemisphere controls the left side of the body and is the center for creative thinking, intuition, and artistic abilities.

The cerebral hemispheres are divided into four lobes: frontal, parietal, temporal, and occipital. Some functions of the lobes are distinct; others are integrated. The frontal lobes control the organization of thought, body movement, memories, emotions, and moral behavior. The integration of all this information regulates arousal, focuses attention, and enables problem- solving and decision-making. **Abnormalities in the frontal lobes** are associated with schizophrenia, attention-deficit/hyperactivity disorder (ADHD), and dementia. The parietal lobes interpret sensations of taste and touch and assist in spatial orientation. The temporal lobes are centers for the senses of smell and hearing and for memory and emotional expression. The occipital lobes assist in coordinating language generation and visual interpretation, such as depth perception.

Cerebellum

The cerebellum 1s located below the cerebrum and is the center for coordination of movements and postural adjustments. It receives and integrates information from all areas of the body, such as the muscles, joints, organs, and other components of the CNS. Research has shown that inhibited transmission of dopamine, a neurotransmitter, in this area is associated with the lack of smooth coordinated movements in diseases such as Parkinson disease and dementia.

Brain Stem

The brain stem includes the midbrain, pons, and medulla oblongata and the nuclei for cranial nerves III through XII. The medulla, located at the top of the spinal cord, contains vital centers for respiration and cardiovascular functions. Above the medulla and in front of the cerebrum, the pons bridges the gap both structurally and functionally, serving as a primary motor pathway. The midbrain connects the

pons and cerebellum with the cerebrum. It measures only 0.8 in (2 cm) length and includes most of the reticular activating system and the extrapyramidal system. The reticular activating system influences motor activity, sleep, consciousness, and awareness. The extrapyramidal system relays information about movement and coordination from the brain to the spinal nerves. The locus coeruleus, a small group of norepinephrine producing neurons in the brain stem, is associated with stress, anxiety, and impulsive behavior.

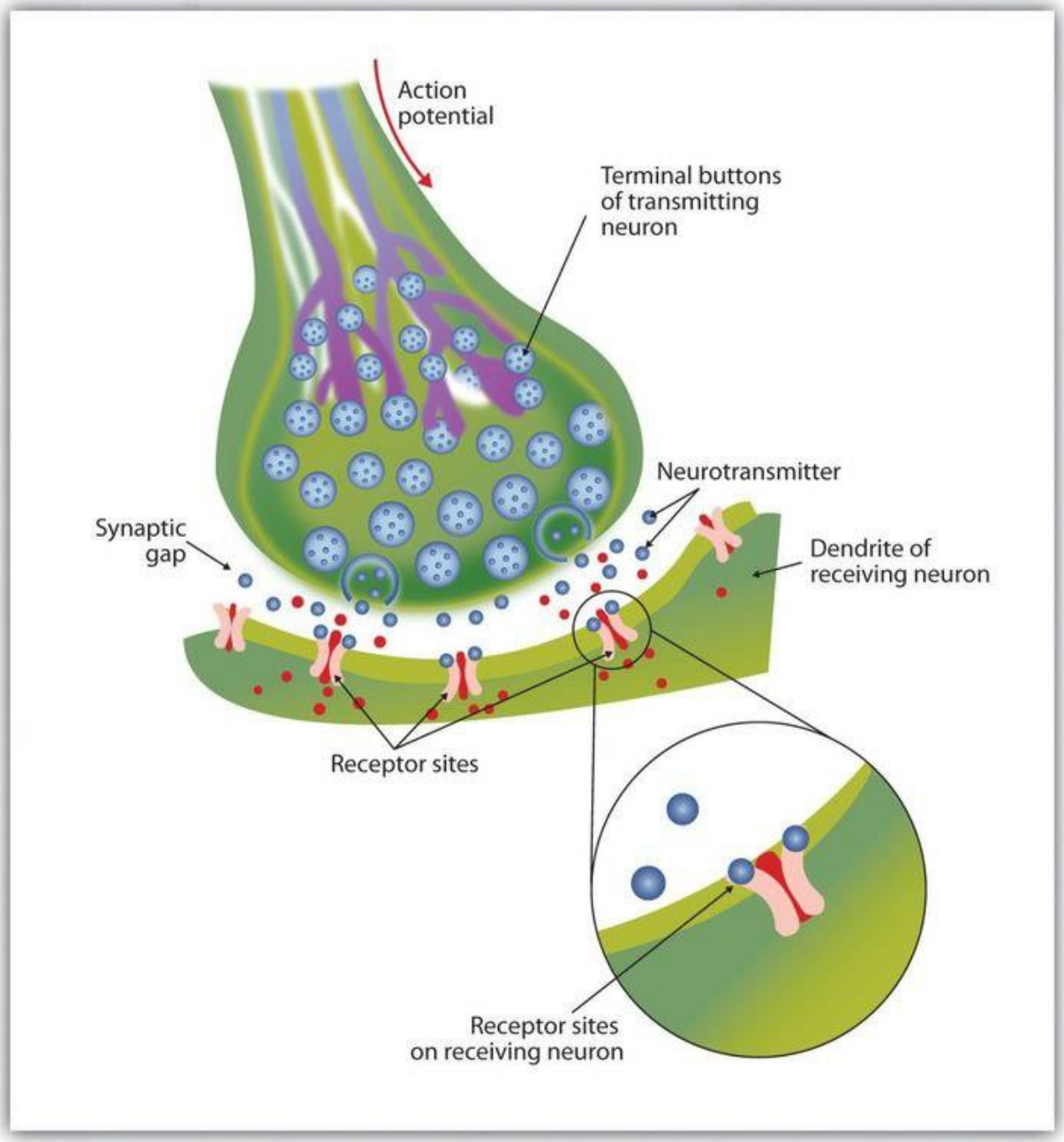
Limbic System

The **limbic system** is an area of the brain located above the brain stem that includes the thalamus, hypothalamus, hippocampus, and amygdala (although some sources differ regarding the structures this system includes). The thalamus regulates activity, sensation, and emotion. The hypothalamus is involved in temperature regulation, appetite control, endocrine function, sexual drive, and impulsive behavior associated with feelings of anger, rage, or excitement. The hippocampus and amygdala are involved in emotional arousal and memory. Disturbances in the limbic system have been implicated in a variety of mental illnesses, such as the memory loss that accompanies dementia and the poorly controlled emotions and impulses seen with psychotic or manic behavior.

Neurotransmitters

Approximately 100 billion brain cells form groups of neurons, or nerve cells, that are arranged in networks. These neurons communicate information with one another by sending electrochemical messages from neuron to neuron, a process called *neurotransmission.* These electrochemical messages pass from the dendrites (projections from the cell body), through the soma or cell body, down the axon

(long extended structures), and across the synapses (gaps between cells) to the dendrites of the next neuron. In the nervous system, the electrochemical messages cross the synapses between neural cells by way of special chemical messengers called neurotransmitters. Neurotransmitters are the chemical substances manufactured in the neuron that aid in the transmission of information throughout the body. They either excite or stimulate an action in the cells (excitatory) or inhibit or stop an action (inhibitory). These neurotransmitters fit into specific receptor cells embedded in the membrane of the dendrite, just like a certain key shape fits into a lock. After neurotransmitters are released into the synapse and relay the message to the receptor cells, they are either transported back from the synapse to the axon to be stored for later use (reuptake) or metabolized and inactivated by enzymes, primarily monoamine oxidase (MAO)


Action potential
Terminal buttons of transmitting neuron
Neurotransmitter
Synaptic gap
Dendrite of receiving neuron
Receptor sites
Receptor sites on receiving neuron

Dopamine

Dopamine is implicated in schizophrenia and other psychoses as well as movement disorders such as Parkinson's disease. Antipsychotic medications work by blocking dopamine receptors and reducing dopamine activity.

Norepiphrine and epinephrine

Excess norepinephrine has been implicated in several anxiety disorders; deficits may contribute to memory loss, social withdrawal, and depression.

Serotonin

Serotonin plays an important role in anxiety and mood disorders and schizophrenia.

Histamine

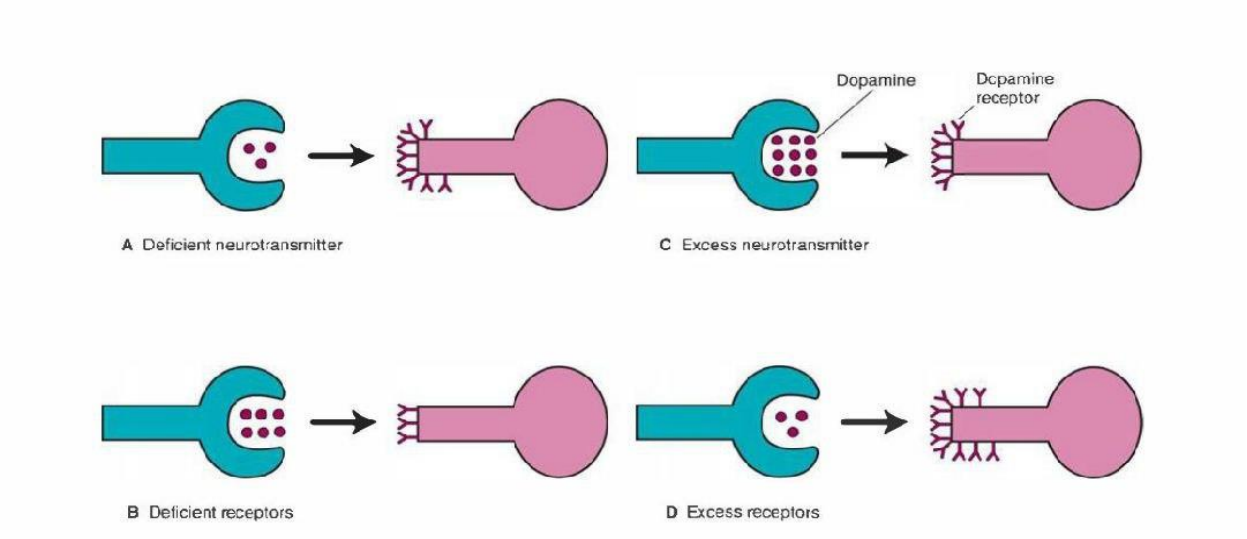
The role of histamine in mental illness is under investigation.

Acetylcholine

Studies have shown that people with Alzheimer's disease have decreased acetylcholine-secreting neurons.

Glutamate

Glutamate is an excitatory amino acid that, at high levels, can have major neurotoxic effects. Glutamate has been implicated, degenerative diseases such as Huntington's or Alzheimer's.



Type	Mechanism of Action	Physiologic Effects	Possible implication
Dopamine	Excitatory	Controls complex movements, motivation, cognition; regulates emotional response	Parkinson's disease, depression, schizophrenia, mania.
Norepinephrine (noradrenaline)	Excitatory	Causes changes in attention, learning and memory, sleep and wakefulness, mood	depression , mania , anxiety, schizophrenia
Epinephrine (adrenaline)	Excitatory	Controls fight or flight response	depression , mania , anxiety, schizophrenia
Serotonin	Inhibitory	Controls food intake, sleep and wakefulness, temperature regulation, pain control, sexual behaviors, regulation of emotions	schizophrenia , anxiety state, depression

Type	Mechanism of Action	Physiologic Effects	Possible implication
Histamine	Neuromodulator	Controls alertness, gastric secretions, cardiac stimulation, peripheral allergic responses	Schizophrenia, mood disorder
Acetylcholine	Excitatory or inhibitory	Controls sleep and wakefulness cycle; signals muscles to become alert	disorder of motor behavior and memory such as parkinson's hungtington's chorea ,alzhiheimer's
Neuropeptides	Neuromodulators	Enhance, prolong, inhibit, or limit the effects of principal neurotransmitters	Modulation of dopamine

Type	Mechanism of Action	Physiologic Effects	Possible implication
Glutamate	Excitatory	Results in neurotoxicity if levels are too high	Schizophrenia, mood disorder, anxiety disorder, cognitive disorder
γ-Aminobutyric Acid (GABA)	Inhibitory	Modulates other neurotransmitters	decreased ---anxiety disorder , Huntington chorea , epilepsy

NEUROBIOLOGIC CAUSES OF MENTAL ILLNESS

Genetics and Heredity

Unlike many physical illnesses that have been found to be hereditary, such as cystic fibrosis, Huntington disease, and Duchene muscular dystrophy, the origins of mental disorders do not seem to be simple. Current theories and studies indicate that several mental disorders may be linked to a specific gene or combination of genes but that the source is not solely genetic; non-genetic factors

also play important roles. To date, one of the most promising discoveries is the identification in 2007 of variations in the gene *SORLl* that may be a factor in late-onset Alzheimer disease. Research is continuing in an attempt to find genetic links to other diseases such as schizophrenia and mood disorders.

Three types of studies are commonly conducted to investigate the genetic basis of mental illness:

l. ***Twin studies*** are used to compare the rates of certain mental illnesses or traits in monozygotic (identical) twins, who have an identical genetic makeup, and dizygotic (fraternal) twins, who have a different genetic makeup

2. ***Adoption*** *studies* are used to determine a trait among biologic versus adoptive family members.

3. ***Family studies*** are used to compare whether a trait is more common among first-degree relatives (parents, siblings, and children) than among more distant relatives or the general population.

Stress and the Immune System (Psychoimmunology)

Researchers are following many avenues to discover possible causes of mental illness. **Psychoimmunology,** a relatively new field of study, examines the effect of psychosocial stressors on the body's immune system. A compromised immune system could contribute to the development of a variety of illnesses, particularly in populations already genetically at risk. So far, efforts to link a specific stressor with a specific disease have been unsuccessful. However, the immune system and the brain can influence neurotransmitters. When the inflammatory response is critically involved in illnesses such as multiple sclerosis or lupus erythematous, mood dysregulation and even depression are common.

Infection as a Possible Cause

Some researchers are focusing on infection as a cause of mental illness. Most studies involving viral theories have focused on schizophrenia, but so far, none has provided specific or conclusive evidence. Theories that are being developed and tested include the existence of a virus that has an affinity for tissues of the CNS, the possibility that a virus may actually alter human genes, and maternal exposure to a virus during critical fetal development of the nervous system. Prenatal infections may impact the developing brain of the fetus, giving rise to a proposed theory that inflammation may causally contribute to the pathology of schizophrenia

Lecturer

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