6.2: Basic Concepts

Before learning about cognitive impairment, it is important to understand the physiological processes of normal growth and development. **Growth** includes physical changes that occur during the development of an individual beginning at the time of conception. **Development** encompasses these biological changes, as well as social and cognitive changes that occur continuously throughout our lives. Cognition starts at birth and continues throughout the life span. See Figure 6.1 for an image of the human life cycle.

Figure 6.1 Human Life Cycle

There are multiple factors that affect human cognitive development. While there are expected milestones along the way, cognitive development encompasses several different skills that develop at different rates. Cognition takes the form of many paths leading to unique developmental ends. Each human has their own individual experience that influences development of intelligence and reasoning as they interact with one another. With these unique experiences, everyone has a memory of feelings and events that is exclusive to them.
Developmental Stages

As newborns, we learn behavior and communication to help us to interact with the world around us and to fulfill our needs. For example, crying provides communication to cue parents or caregivers about a newborn’s needs. The human brain undergoes tremendous development throughout the first year of life. As infants receive and experience input from the environment, they begin to interact with the individuals around them as they learn and grow.

Jean Piaget, a well-known cognitive development theorist, noted that children explore the world as they attempt to make sense of their experiences. His theory explains that humans move from one stage to another as they seek cognitive equilibrium and mental balance. There are four stages in Piaget’s theory of development that occur in children from all cultures:

- The first stage is the Sensorimotor period. It extends from birth to approximately two years and is a period of rapid cognitive growth. During this period, infants develop an understanding of the world by coordinating sensory experiences (seeing, hearing) with motor actions (reaching, touching). The main development during the sensorimotor stage is the understanding that objects exist and events occur in the world independently of one’s own actions. Infants develop an understanding of what they want and what they must do to have their needs met. They begin to understand language used by those around them to make needs met.

- Infants progress from the Sensorimotor period to a Pre-Operational period in their toddler years. This continues through early school age years. This is the time frame when children learn to think in images and symbols. Play is an important part of cognitive development during this period.

- Older school age children (age 7 years to 11 years) enter a Concrete Operations period. They learn to think in terms of processes and can understand that there is more than one perspective when discussing a concept. This stage is considered a major turning point in the child’s cognitive development because it marks the beginning of logical or operational thought.

- Adolescents transition to the Formal Operations stage around age 12 as they become self-conscious and egocentric. As adolescents enter this stage, they gain the ability to think in an abstract manner by manipulating ideas in their head. Moving toward adulthood, this further develops into the ability to critically reason.

Cognitive impairments in children range from mild impairment in these specific operations to profound intellectual impairments leading to minimal independent functioning. **Cognitive impairment** is a term used to describe impairment in mental processes that drive how an individual understands and acts in the world, affecting the acquisition of information and knowledge. The following areas are domains of cognitive functioning:

- Attention
- Decision-making
- General knowledge
- Judgment
- Language
- Memory
- Perception
- Planning
- Reasoning
Intellectual disability (formerly referred to as mental retardation) is a diagnostic term that describes intellectual and adaptive functioning deficits identified during the developmental period. In the United States, the developmental period refers to the span of time prior to the age 18. Children with intellectual disabilities may demonstrate a delay in developmental milestones (e.g., sitting, speaking, walking) or demonstrate mild cognitive impairments that may not be identified until school age. Intellectual disability is typically nonprogressive and lifelong. It is diagnosed by multidisciplinary clinical assessments and standardized testing and is treated with a multidisciplinary treatment plan that maximizes quality of life. See Figure 6.2 for an image of an adolescent with an intellectual disability participating in a Special Olympics event.

Adults and Older Adults

There are several physical changes that occur in the brain due to aging. The structure of neurons change, including a decreased number and length of dendrites, loss of dendritic spines, a decrease in the number of axons, an increase in axons with segmental demyelination, and a significant loss of synapses. Loss of synapse is a key marker of aging in the nervous system. These physical changes occur in older adults experiencing cognitive impairments, as well as in those who do not. See Figure 6.3 of an older adult experiencing typical physical changes of aging.
It is a common myth that all individuals experience cognitive impairments as they age. Many people are afraid of growing older because they fear becoming forgetful, confused, and incapable of managing their daily life leading to incorrect perceptions and ageism. Ageism refers to stereotyping older individuals because of their age. Losing language skills, becoming unable to make decisions appropriately, and being disoriented to self or surroundings are not normal aging changes.

**Dementia, Delirium, and Depression**

If changes in cognition in adults do occur, a complete assessment is required to determine the underlying cause of the change and if it is caused by an acute or chronic condition. For example, dementia is a chronic condition that affects cognition whereas depression and delirium can cause acute confusion with a similar clinical appearance to dementia.

**Dementia**

Dementia is a chronic condition of impaired cognition, caused by brain disease or injury, and marked by personality changes, memory deficits, and impaired reasoning. Dementia can be caused by a group of conditions, such as...
Alzheimer’s disease, vascular dementia, frontal-temporal dementia, and Lewy body disease. Clinical manifestations of dementia include forgetfulness, impaired social skills, and impaired decision-making and thinking abilities that interfere with daily living. It is gradual, progressive, and irreversible. While dementia is not reversible, appropriate assessment and nursing care improve the safety and quality of life for those affected by dementia.

As dementia progresses and cognition continues to deteriorate, nursing care must be individualized to meet the needs of the patient and family. Providing patient safety and maintaining quality of life while meeting physical and psychosocial needs are important aspects of nursing care. Unsafe behaviors put individuals with dementia at increased risk for injury. These unsafe or inappropriate behaviors often occur due to the patient having a need or emotion without the ability to express it, such as pain, hunger, anxiety, or the need to use the bathroom. The patient’s family/caregivers require education and support to recognize that behaviors are often a symptom of dementia and/or a communication of a need and to help them to best meet the needs of their family member.

Delirium

Delirium is an acute state of cognitive impairment that typically occurs suddenly due to a physiological cause, such as infection, hypoxia, electrolyte imbalances, drug effects, or other acute brain injury. Sensory overload, excess stress, and sleep deprivation can also cause delirium. Hospitalized older adults are at increased risk for developing delirium, especially if they have been previously diagnosed with dementia. One third of patients aged 70 years or older exhibit delirium during their hospitalization. Delirium is the most common surgical complication for older adults, occurring in 15 to 25% of patients after major elective surgery and up to 50% of patients experiencing hip-fracture repair or cardiac surgery.

The symptoms of delirium usually start suddenly, over a few hours or a few days, and they often come and go. Common symptoms include the following:

- Changes in alertness (usually most alert in the morning and decreased at night)
- Changing levels of consciousness
- Confusion
- Disorganized thinking or talking in a way that do not make sense
- Disrupted sleep patterns or sleepiness
- Emotional changes: anger, agitation, depression, irritability, overexcitement
- Hallucinations and delusions
- Incontinence
- Memory problems, especially with short-term memory
- Trouble concentrating

Delirium and dementia have similar symptoms, so it can be hard to tell them apart. They can also occur together.

Nurses must closely monitor the cognitive function of all patients and promptly report any changes in mental status to the health care provider. The provider will take a medical history, perform a physical and neurological examination, perform mental status testing, and may order diagnostic tests based on the patient’s medical history. After the cause of
delirium is determined, treatment is targeted to the cause to reverse the effects. See Figure 6.4\textsuperscript{[16]} for an illustration of an older adult experiencing delirium.

**Note**

Download an algorithm to assess delirium in older adults with dementia from The Hartford Institute for Geriatric Nursing.\textsuperscript{[17]}

General interventions to prevent and treat delirium in older adults are as follows:

- Control the environment. Make sure that the room is quiet and well-lit, have clocks or calendars in view, and encourage family members to visit.
- Ensure a safe environment with the call light within reach and side rails up as indicated.
- Administer prescribed medications, including those that control aggression or agitation, and pain relievers if there is pain.
- Ensure the patient has their glasses, hearing aids, or other assistive devices for communication in place. Lack of assistive sensory devices can worsen delirium.
- Avoid sedatives. Sedatives can worsen delirium.
- Assign the same staff for patient care when possible.\textsuperscript{[18]}

**Depression**

Depression is a brain disorder with a variety of causes, including genetic, biological, environmental, and psychological factors. It is a commonly untreated condition in older adults that can result in impaired cognition and difficulty in making decisions. It is likely to occur in response to major life events involving health and loved ones. Having other chronic health problems, such as diabetes, dementia, Parkinson’s disease, cancer, heart disease, and kidney disease, increases the likelihood for depression in older adults and can cause the loss of their ability to maintain independence.\textsuperscript{[19]} See Figure 6.5\textsuperscript{[20]} for an illustration of an older adult experiencing symptoms of depression.
Symptoms of depression include the following:

- Feeling sad or “empty”
- Loss of interest in favorite activities
- Overeating or not wanting to eat at all
- Not being able to sleep or sleeping too much
- Feeling very tired
- Feeling hopeless, irritable, anxious, or guilty
- Aches, pains, headaches, cramps, or digestive problems
- Thoughts of death or suicide

Depression is treatable with medication and psychotherapy. However, older adults have an increased risk for suicide, with the suicide rates for individuals over age 85 years the second highest rate overall. Nurses should provide appropriate screening to detect potential signs of depression as an important part of promoting health for older adults.

Comparison of Three Conditions

When an older adult presents with confusion, determining if it is caused by delirium, dementia, depression, or a combination of these conditions can pose many challenges to the health care team. It is helpful to know the patient’s baseline mental status from a family member, caregiver, or previous health care records. If a patient’s baseline mental status is not known, it is an important patient safety consideration to assume that confusion is caused by delirium with a thorough assessment for underlying causes. See Table 6.2 for a comparison of symptoms of dementia, delirium, and depression.

Table 6.2 Comparison of Dementia, Delirium, and Depression

<table>
<thead>
<tr>
<th>Onset</th>
<th>Dementia</th>
<th>Delirium</th>
<th>Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vague, insidious onset; symptoms progress slowly</td>
<td>Sudden onset over hours and days with fluctuations</td>
<td>Onset often rapid with identifiable trigger or life event such as</td>
</tr>
</tbody>
</table>

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[21] https://med.libretexts.org/Bookshelves/Nursing/Nursing_Fundamentals_(OpenRN)/06%3A_Cognitive_Impairments/6.02%3A_...
<table>
<thead>
<tr>
<th>Symptom</th>
<th>Bereavement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms</td>
<td>Symptoms may go unnoticed for years. May attempt to hide cognitive problems or may be unaware of them. Often disoriented to time, place, and person. Impaired short-term memory and information processing. Confusion is often worse in the evening (referred to as “sundowning”).</td>
</tr>
<tr>
<td>Consciousness</td>
<td>Obvious at early stages and often worse in the morning. Can include subjective complaints of memory loss</td>
</tr>
<tr>
<td>Impaired attention/alertness</td>
<td>Normal</td>
</tr>
<tr>
<td>Emotional lability with anxiety, fear, depression, aggression. Variable cognitive performance</td>
<td>Distressed/unhappy. Variable cognitive performance</td>
</tr>
<tr>
<td>Mental State</td>
<td>Possibly labile mood. Consistently decreased cognitive performance</td>
</tr>
<tr>
<td>Distressed/unhappy</td>
<td>Variable cognitive performance</td>
</tr>
<tr>
<td>Delusions/Hallucinations</td>
<td>Common</td>
</tr>
<tr>
<td>Common</td>
<td>Rare</td>
</tr>
<tr>
<td>Psychomotor Disturbance</td>
<td>Psychomotor disturbance present – hyperactive, purposeless, or apathetic</td>
</tr>
<tr>
<td>Slowed psychomotor status in severe depression</td>
<td></td>
</tr>
</tbody>
</table>
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