

**Mega-Concept:** Health and Illness

**Category:** Cognitive and Behavioral Processes

**Concept Name:** Cognition

**Concept Definition:**

Cognition involves the processes involved in human thought ranging from (a) the reception of sensory input; (b) the processing and storage of the input; and (c) the later retrieval and use of the input (Giddens, 2017, p. 337).

**Scope and Categories:**

Cognition encompasses perceptual motor function, language, learning and memory, social cognition, complex attention, and executive functioning (Giddens, 2017). The scope of cognition ranges from intact (i.e. the cognitive behaviors one displays adhere to what is expected based on one's age and culture) to impaired (i.e. a brain pathology or environmental stimulus affecting brain function results in a discernible impairment in one or more cognitive process) (Giddens, 2017. P. 337).

- **Intact Cognition:** The scope of intact cognition varies by age. During childhood and adolescence cognitive developmental monitoring facilitates early detection of any developmental delays (Centers for Disease Control and Prevention, 2013). At the other end of the lifespan some decline in cognitive performance is expected and should not inhibit the individual from retaining functional ability to manage occupational, social and other activities of daily living (Registered Nurses' Association of Ontario, 2016).
- **Impaired Cognition:** Cognitive impairment interferes with information processing, causing negative effects on the functional status normal for the individual's developmental stage. Impaired cognition is categorized as either acute or chronic.
- **Acute cognitive impairment** which may be termed as acute confusion or delirium is an emergent condition characterized by rapid onset, brief duration and a fluctuating course. Acute cognitive impairment is a predictor of long-term cognitive impairment (e.g. dementia) and an important marker for mortality and morbidity, but with early recognition it is reversible (Maldonado, 2008; Pandharipande, et. al., 2013).
- **Chronic cognitive impairment** or chronic confusion is a non-emergent condition characterized by a gradual, steady decline in cognitive functioning (Maslow & Mezey, 2008). This encompasses pathologies such as vascular dementia, dementia with Lewy bodies,

Alzheimer's disease, and dementia from other causes (Lewis, Dirksen, Heitkemper, & Bucher, 2017).

### **Risk Factors**

- **Populations at Risk**

- **Elders:** The elderly are the highest risk population for acute or chronic cognitive impairment, and 60%-80% of all elderly medical-surgical patients have acute cognitive impairment (Maldonado, 2008).
- **Children:** The risk for injury is high in children (CDC, 2013b), and since so many injuries lead to cognitive impairment children are therefore also at risk.
- **People with critical illness, regardless of age:** A growing body of research suggests patients with critical illness are more susceptible to delirium and long-term cognitive impairment (Pandharipande et al., 2013)

- **Individual Risk Factors**

- Physical trauma (e.g. TBI)
- Psychological trauma
- Critical illness (hospitalization in an intensive care unit)
- Medications and other substances
- Neurologic problems
- Cardiovascular problems
- Metabolic problems
- Infection
- Immobility
- Vision and hearing impairment
- Dehydration
- Nutritional deficits
- Sleep disturbances

### **Physiological Processes**

- Decreased oxygenation (Maldonado, 2008).
  - Decreased oxygen supply
  - Increased oxygen demand
    - Abnormal neurotransmitter synthesis and regulation
    - Increase in neurotoxic by-products (Maldonado, 2008).
  - Once the neurochemical cascade begins, there is an onset of disorientation and thought disturbances that vary by acuity. During early impairment there may be only



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some disorientation or somnolence which may or may not progress to varying degrees of psychosis.

- Neurotransmitter dysregulation usually involving dopamine and serotonin (Lewis, Dirksen, Heitkemper, & Bucher, 2017),

### **Consequences**

- Reduced ability to focus
- Restlessness, lethargy, and/or disorientation
- Multiple disorders of perception and cognition
- Impaired functional status.

### **Assessment/Attributes:**

#### **Assessment Priorities:**

Since acute cognitive impairment is differentiated from chronic impairment by its rapid onset, fluctuating course and brief duration, an accurate history is essential. Specifically, the nurse should look for any change from baseline cognitive functioning. (Maslow & Mezey, 2008).

#### **Subjective:**

Nurses should be vigilant for any decline in functional status, and any presence of perceptual disturbances or thought content disorders.

- Health history
- Mental status assessment
  - Confusion Assessment Method (CAM) to screen for delirium
  - Mini-Mental Status Exam and Mini-Cog to screen for dementia
- Impaired Functional Status:
- Perceptual Disorders

### **Diagnostic Tests:**

- Lab values to establish or rule out infectious disorders, electrolyte disturbances, metabolic disorders or blood problems (e.g., anemia, hypoglycemia, ketosis)
- Pulse oximetry and capnography: Gas exchange
- Magnetic Resonance Imaging (MRI) and Positron Emission Testing (PET): Establish brain problems such as traumatic brain injury or cerebrovascular accidents, and the psychiatric evaluation is aimed at detecting psychiatric etiologies.
- Biomarkers such as beta-amyloid and tau proteins in Alzheimer's Disease (Lewis, Dirksen, Heitkemper, & Bucher, 2017)

### **Clinical Management:**

**Primary Prevention (Health Promotion)**

It is a standard of nursing practice to prevent the onset of cognitive impairment. There are several key responsibilities for nurses in this role and they are:

- Optimize sleep
- Minimize immobilization/Early mobilization
- Adequate hydration
- Monitor oxygenation
- Manage pain
- Enhance sensory perception (e.g. hearing and vision aids)
- Medication management

The early recognition of cognitive impairment is part of primary prevention that overlaps secondary prevention. Cognitive impairment is recognized when there is any:

- Change in mental status
- Change in orientation
- Change in alertness
- Change in perception
- Change in communication

Hyperkinetic, hypokinetic or mixed behaviors may also indicate the onset of confusion. Sleep-wake disturbances (“sundowning”) are also behavioral indications of confusion.

**Secondary Prevention (Screening)**

Screening for Delirium, Dementia and Depression in Older Adults (RNAO, 2003) is highly recommended as a complete compendium of resources for screening instruments that the generalist nurse can immediately access and implement. Examples of screening instruments are:

- The Mini Mental State Exam (MMSE)
- The Confusion Rating Scale (CRS)
- The NEECHAM Confusion Scale
- The Confusion Assessment Method (CAM)
- The Delirium Symptom Interview (DSI)

**Tertiary Prevention (Collaborative Interventions)**

The nurse is in an ideal position to detect these signs and symptoms of cognitive impairment. Once your patient has delirium there are non-pharmacological interventions the nurse may



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initiate independently and many collaborative interventions. In both cases the treatment should be focused on identifying and resolving the underlying condition.

Non-pharmacologic nursing interventions initially take aim at symptom reduction and protection from injury. This includes maintaining a safe environment, reorienting the patient, monitoring vital signs and lab values, and avoiding anxiolytics or other anti-cholinergic medications. Other suggestions for non-pharmacologic treatment of confusion include repeated orientation methods such as opening the curtains in the morning, having a clock and calendar visible, and maintaining seasonal decorations. Range of motion and the elimination of restraints, sleep protocol (sleep “hygiene”), and consistency of caregivers and environment are essential.

Pharmacology related to cognitive impairment is too complex for a thorough discussion in this overview. However, a general overview may be achieved by referring to Table 1 and cross-referencing particular medications and drug category with the target neuro-transmitter. Cholinergic therapy has been successfully implanted to slow Alzheimer’s disease progression. It can also be seen in Table 1 that the anti-psychotic medication category blocks dopamine receptors because psychosis is associated with increased dopamine. Furthermore, as the anti-psychotic medications lower dopamine painful and dangerous side effects known as extrapyramidal side effects (EPS) may emerge.

As can be seen in Table 1 when dopamine decreases then symptoms of Parkinson’s disease may appear and this is called drug-induced parkinsonism. Drug-induced parkinsonism may include any of the symptoms of Parkinson’s disease, including tremor, rigidity and bradykinesia (Kamin, Manwani & Hughes, 2000). As in Parkinson’s disease, these symptoms may be alleviated by anticholinergic medications although a subjective restlessness known as akathisia will not be improved with anticholinergics. Objective evidence of akathisia appears to the observer as nervous pacing, rocking and perhaps the repetitive shifting of weight from one foot to the other. Akathisia may sometimes be alleviated by anti-anxiety medications but often patients must choose between akathisia and psychosis. Neuroleptic Malignant Syndrome (NMS) is a rare but life-threatening side effect of antipsychotic medications and it is characterized by severe muscular rigidity, and fever. Early recognition and treatment of NMS greatly improves the outcomes and if NMS is suspected the situation should be treated as a true emergency (Kamin, Manwani & Hughes).

Tardive Dyskinesia (TD) is yet another extrapyramidal side effect, but the only treatment for TD is discontinuation of the medication. TD appears as protrusion and writhing of the tongue, teeth grinding and lip smacking. When it occurs it usually appears after 6 months on the

antipsychotic medications or after dose increases. Later generation antipsychotics have a much lower incidence of TD.

Emerging research suggests the overuse of sedative medications in critical care settings predicts delirium and long-term cognitive impairment (e.g. changes in executive function) after the resolution of critical illness (Pandharipande, et al., 2013).

### **Interrelated Concepts:**

- **Intracranial Regulation:** Vascular dementia often occurs in the setting of ischemic or hemorrhagic lesions to the brain; mixed dementia involves two types of dementia which are most commonly the combination of Alzheimer's disease and vascular dementia (Lewis, Dirksen, Heitkemper, & Bucher, 2017).
- **Stress & Coping:** Stressful events directly affect cognitive functioning, usually for the worse but the stress of mild and moderate anxiety (below) may increase cognitive functioning.
- **Mood and Affect:** Mild instability of mood and affect can result in decreased cognitive functioning such as short term recall. Extreme affective states can result in extreme cognitive dysfunction including psychosis.
- **Comfort:** Any cognitive deficit is very uncomfortable but any significant cognitive deficit (e.g. early dementia) may be associated with more extreme affective states including rage, mania and depression.
- **Anxiety:** Increasing anxiety will initially increase cognitive functioning into moderate levels of anxiety but if anxiety increases further cognition will decrease.
- **Patient Education:** Patient education about cognition is a broad topic because it depends on the underlying etiology of any cognitive problem. However, patient education in general increases the patient's therapeutic alliance with the nurse so that a collaborative plan for the patient's treatment can be developed.
- **Healthcare Policy:** The Affordable Care Act will expand mental health benefits for approximately 62 million Americans and so individuals with cognitive disorders secondary to mental health problems can hope to receive better care.
- **Healthcare Law:** An individual with acute or chronic confusion may present a danger to himself or others and if so they may be held against their will in accordance with the law of the particular state where such an event occurs.
- **Ethics:** The nurse is always a patient advocate, but he or she may also experience an ethical dilemma when caring for a patient with a history of dangerousness and psychosis and poor medication compliance. On the one hand the patient has the ethical right to refuse treatment but on the other hand the patient may be dangerous as a result.



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- **Health Promotion:** Nurses can model mental health hygiene by stress management and healthy lifestyle choices. When nurses model mental health hygiene they can more effectively motivate and teach their clients to develop their own mental health promotion practices.

### **New Mexico Nursing Education Consortium (NMNEC) Required Exemplars:**

- Intellectual Disabilities
- Dementia/Delirium: Diagnosis Related Group (DRG) 119, Healthcare Cost and Utilization Project (HCUP) 49
- Alzheimer's disease: "Estimates vary, but experts suggest that up to 5 million Americans aged 65 years or older have AD and this number is expected to double by 2050." (Giddens, 2017, p. 345)
- Psychosis: Estimated 2.2% prevalence

### **Optional Exemplars:**

- Schizophrenia
- Developmental Delay
- Autism Spectrum



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### **Resources:**

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Table 1

NEURO-TRANSMITTER	DECREASED LEVEL	INCREASED LEVEL
Acetylcholine	Memory impairment, Delirium, Delusions, <i>Alzheimer's Disease</i>	Aggression, Depression
<p><b><i>Anticholinergic Medications:</i></b> benztropine, diphenhydramine  <b><i>Cholinergic agonists (AcetylCholinesterase inhibitors):</i></b> rivastigmine, donepezil, neostigmine. <i>*Also nerve agents (Sarin gas) are AcetylCholinesterase inhibitors (and some insecticides like malathion)—person can't relax diaphragm so they suffocate</i></p>		
Dopamine	Dementia, Depression, <i>Parkinsonism</i>	Psychosis, Anxiety, Confusion, Aggression
<p><b><i>Dopamine agonist medications:</i></b> Levodopa, amantadine (<i>Symmetrel</i>)  <b><i>Dopamine antagonist:</i></b> <i>antipsychotic medications blockade dopamine</i></p>		
Serotonin	Depression, <b>Anxiety</b> , Aggression	<b>Anxiety (serotonin toxicity)</b>
<p><b><i>Serotonin agonist (SSRI) medications:</i></b> Fluoxetine (Prozac), paroxetine (Paxil), sertraline (Zoloft)</p>		
Norepinephrine	Depression, Dementia	Anxiety, Aggression
<p><b><i>Norepinephrine agonists (NRI and NDRI) medications:</i></b> Many NRI examples, and if they also inhibit reuptake of dopamine (NDRI) then they are associated with getting "high" (e.g. cocaine, ritalin). Tricyclic and tetracyclic antidepressants are NRI</p>		
GABA	Anxiety, aggression	Sedating
<p><b><i>GABA Agonists:</i></b> Benzodiazepines and alcohol stimulate GABA receptors; GABA is a "Natural valium."            Glutamine is precursor to GABA and complex carbs increase glutamine, Exercise increases GABA</p>		