ALZHEIMER’S DISEASE

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ABSTRACT

Alzheimer’s disease is a chronic, progressive neurological disorder that causes profound cognitive and behavioral impairments. Alzheimer’s disease is the most common cause of dementia in older adults, afflicting approximately 5 million Americans. A person’s genetics, lifestyle, and environment play a part in the development of the disease but the cause of Alzheimer’s is not known. Alzheimer’s is a progressive disease for all patients but there can be distinct differences between patients in terms of how they progress. Changes occur slowly and incrementally with some patients experiencing periods called “plateaus,” in which they are stable. Early-onset Alzheimer’s disease takes a more rapidly progressive course. There is no cure for Alzheimer’s disease and attempts at finding easily applied preventative measures have not been successful. The treatment for Alzheimer’s disease at this point focuses on symptomatic relief.
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Policy Statement
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Continuing Education Credit Designation
This educational activity is credited for 1.5 hours. Nurses may only claim credit commensurate with the credit awarded for completion of this course activity.

Pharmacology content is .5 hour (30 minutes).

Statement of Learning Need
Available evidence clearly shows that Alzheimer’s Disease is a very common, serious, and growing public health care problem. A need exists for high-quality education for nurses and caregivers.

Course Purpose
Provide current information on the epidemiology, etiology, clinical presentation, diagnosis, and treatments for Alzheimer’s disease.
Target Audience
Advanced Practice Registered Nurses and Registered Nurses
(Interdisciplinary Health Team Members, including Vocational Nurses
and Medical Assistants may obtain a Certificate of Completion)

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Please take time to complete a self-assessment of knowledge,
on page 4, sample questions before reading the article.

Opportunity to complete a self-assessment of knowledge
learned will be provided at the end of the course.
1. Alzheimer’s disease primarily affects:
   a. the elderly.
   b. men.
   c. the young.
   d. people between 40 and 60.

2. True or false: Environmental risk factors are a proven cause of Alzheimer’s.
   a. True.
   b. False.

3. A family history of Alzheimer’s disease:
   a. has no influence on the risk for Alzheimer’s disease.
   b. only affects women in terms of risk for Alzheimer’s disease.
   c. only increases the risk if the patient has diabetes and hypertension.
   d. significantly increases the risk for Alzheimer’s disease.

4. Which of the following are risk factors for Alzheimer’s disease?
   a. Chronic obstructive pulmonary disease and hepatitis.
   b. Acute kidney disease and anticoagulation with warfarin
   c. Hypertension and diabetes.
   d. Atrial fibrillation and long-term use of anti-depressants.

5. Alzheimer’s disease is characterized by:
   a. cerebral emboli and hyper-coaguability.
   b. vasospasm and Lewy bodies.
   c. cerebral edema and amyloid plaques.
   d. amyloid plaques and neurofibrillary tangles.
**Introduction**

Alzheimer’s disease is a chronic, progressive neurological disorder that causes profound cognitive and behavioral impairments. Alzheimer’s disease is the most common cause of dementia in older adults, afflicting approximately 5 million Americans. Genetic, lifestyle, and environmental risk factors for the development of the disease have been identified but the cause of Alzheimer’s is not known.

The available treatments cannot modify the course of the disease or provide a cure, they can only provide symptomatic relief, and the prognosis for someone who has Alzheimer’s disease is grim; the average life span after diagnosis is 8-10 years. The cost of caring for patients who have Alzheimer’s is very high and as the number of people who develop Alzheimer’s increases in the next few decades the monetary strain will be significant.

**Epidemiology**

As with any disease, the incidence and prevalence statistics of Alzheimer’s disease are always retrospective, but available evidence clearly shows that it is a very common, very serious, and growing public health care problem. The Centers for Disease Control and Prevention (CDC) estimated that in 2013, five million Americans had Alzheimer’s disease.¹ Alzheimer’s disease is the 6th leading cause of death in the United States among all American adults¹, and it is the most common cause of dementia, accounting for approximately 60%-80% of all cases of dementia.²
Alzheimer’s is a disease that primarily afflicts older people. Most cases of Alzheimer’s are diagnosed in people who are 60 years or older, and the prevalence of the disease increases with each decade of life, growing to 20%-40% of the population by age 85. Female gender, even given the greater longevity of women, is a risk factor for the development and progression of Alzheimer’s disease, and Alzheimer’s disease is more common in the African American population.

**Etiology And Pathophysiology Of Alzheimer’s Disease**

Exposure to environmental contaminants, specific lifestyle factors and coupled with chronic medical conditions, and genetics are considered to be the three categories of risk factors that contribute to the development of Alzheimer’s disease. How and in whom they come together to cause the disease and their relative importance are not known. Age is considered to be the biggest risk factor for Alzheimer’s disease.

**Environmental Contaminants**

Exposure to environmental contaminants such as air pollution, industrial chemicals, metals, and pesticides has been associated with an increased risk for the development of Alzheimer’s disease, and many of these are well-known neurotoxins. However, at this time there is no definitive evidence of a cause and effect relationship between exposure to an environmental contaminant and Alzheimer’s disease.
Lifestyle and Medical Conditions

Diabetes, hypertension, obesity, sedentary lifestyle, smoking, and many other diseases and lifestyle factors have been identified as possible risk factors for the development of Alzheimer’s disease.\textsuperscript{8-12} Traumatic brain injury (TBI) is strongly associated with Alzheimer’s disease.\textsuperscript{13}

Genetics

It is often noted that Alzheimer’s has a strong genetic component.\textsuperscript{14} In the development of Alzheimer’s disease there are genetic causes and genetic risk factors.

The number of Alzheimer’s cases that have a clear genetic cause, with little to no environmental influence, is a very small number of the total. Most but not all of these cases are early onset familial Alzheimer’s.

A family history of Alzheimer’s disease is a significant risk factor for developing the disease. An individual who has a first-degree relative (\textit{i.e.}, sibling or parent) with Alzheimer’s disease has double the risk for Alzheimer’s, and the importance of this inherited risk increases as we age the person ages.\textsuperscript{14}

Late-onset Alzheimer’s is the most common form of the disease. Although genetic risk factors for late-onset Alzheimer’s have been identified, how they increase risk is not understood.\textsuperscript{14} Genetic risk factors are not present in all patients who have Alzheimer’s.
Alzheimer’s disease causes two distinct pathophysiological changes in the brain: the formation of amyloid plaques and neurofibrillary tangles. These pathological changes cause permanent damage to neurons and synapses and affect three primary ways that neurons maintain their normal functioning and health: communication, metabolism, and repair. The amyloid plaques are essentially comprised of clumps of amyloid-β peptides, protein constituents which are produced by abnormal processing of amyloid precursor protein (APP); APP is part of the cell membrane of neurons but its exact function is not known.

The amyloid plaques damage neuronal synapses, interfere with normal synaptic transmission, and may cause or contribute to inflammation and oxidative damage in the brain. The neurofibrillary tangles are intracellular support structures in the neurons called microtubules that have had a breakdown in a specific protein called tau. The tau protein is essential for maintaining the integrity of the microtubules - and thus the structural soundness of neurons - and when tau is damaged the microtubules are damaged, and the neuron cannot function and will eventually die.

The formation of amyloid plaques and neurofibrillary tangles is the hallmark of Alzheimer’s disease, but it is not completely clear how these pathological changes can cause the clinical characteristics and the cognitive decline associated with the disease. In addition, these lesions are found in the brains of people who do not have Alzheimer’s disease, although the areas of the brain that are affected and the total number of the pathological lesions are different.
Clinical Features Of Alzheimer’s Disease

The clinical features of Alzheimer’s disease are varied and complex. Although Alzheimer’s is a progressive disease for all patients, there can be distinct differences between patients in terms of how they progress. The changes can occur slowly and incrementally but some patients may have periods - plateaus - in which they are stable. Early-onset Alzheimer’s disease takes a more rapidly progressive course. However, all patients will eventually be unable to socialize or perform self-care. The presentation or progression of Alzheimer’s disease is often described as having four stages: pre-clinical, mild, moderate, and severe.\(^{15}\)

Cognitive impairments are the most prominent clinical feature in patients who have Alzheimer’s disease, but physical impairments, language, speech, and visuospatial impairments, and significant behavioral and emotional disorders are also common. These can be very disabling in the later stages of the disease and all of them, the cognitive and physical impairments, visuospatial impairments, language/speech disorders, and the behavioral and emotional disorders, profoundly affect quality of life.

Cognitive Impairments

Cognitive impairments are perhaps the most striking feature of Alzheimer’s disease. They typically follow a characteristic pattern and begin with memory problems, and memory disorders are one of the most prominent features of Alzheimer’s disease.\(^3\) The patient will forget a conversation that she or he recently had. Names and dates and the location of familiar items cannot be recalled. Initially the
memory problems of Alzheimer’s disease can be relatively mild and ascribed to aging, but eventually it becomes clear to family, friends, and occasionally the patient that this forgetfulness is serious and indicates the presence of a disease process.

The memory impairments of Alzheimer’s disease are not like the memory lapses that are associated with aging: they are progressive, they interfere with the activities of daily living, and their presence can be confirmed using a standardized memory test. If the patient’s memory capabilities are below a certain point on standardized memory tests, the patient is said to have mild cognitive impairment, a precursor to Alzheimer’s disease.

Learning Break:
The term mild cognitive impairment seems at first reading to be imprecise and vague, but there is a diagnostic procedure that is used to define and detect mild cognitive impairment, and this pathology has important prognostic significance. Mild cognitive impairment is considered to represent an early stage in the progression from normal mental status to Alzheimer’s disease, and approximately 50% of patients who have mild cognitive impairment will develop Alzheimer’s disease within four years.

Difficulties with what are often called higher intellectual functions are also common. The patient with Alzheimer’s cannot reason, or at least reason effectively; the patient has difficulty concentrating; abstract thinking and the ability to plan and organize are seriously diminished;
and, simple tasks that require judgement - or any of the other skills that were mentioned - cannot be performed. The physical impairments of Alzheimer’s disease are usually the most pronounced in the later stages. Patients can be incontinent of feces and urine. They are often immobile, and the complications of immobility such as pneumonia, aspiration, infections, or complications of pressure ulcers are the usual causes of death from Alzheimer’s disease.

Language difficulties are quite common in the early stages of Alzheimer’s disease, affecting 40%-50% of all patients.\textsuperscript{17} Patients have difficulty finding the right word to say, their speech content is rambling, and they may have a condition called paraphasia in which unintended sounds, syllables, and words are spoken. Aphasia, a communication disorder, develops in Alzheimer’s patients. In the later stages of the disease patients can develop expressive aphasia, global aphasia, and receptive aphasia. Visuospatial abilities - roughly defined as perceiving spatial relations between objects - deteriorate as the disease progresses, presenting another challenge for this patient population.\textsuperscript{18}

Ordinary day-to-day, self-care activities such as dressing, driving, using eating utensils, reading, locating something in the environment, navigating distances or finding one’s way from one place to another are affected. A patient may lose the ability to distinguish colors. Almost anything that requires coordination of the visual field with motor activities can be difficult or impossible to perform.\textsuperscript{3,17}

The behavioral and emotional disturbances and personality changes that are associated with Alzheimer’s disease can be devastating for the
They also present significant management challenges because they are intimately and inextricably linked to cognitive, physical, language impairments of the disease that are organic in nature and cannot be changed; they are often resistant to treatment; and, they are numerous and complex.

The following list highlights behavioral and emotional disturbances that are common to Alzheimer’s disease; however, this list could easily be expanded.

**BEHAVIORAL AND EMOTIONAL DISTURBANCES**

- Agitation
- Confusion
- Delusions
- Depression
- Mood swings
- Physical and verbal aggression
- Psychosis
- Sleep disturbances
- Social withdrawal
- Wandering

The diagnosis of Alzheimer’s disease is made by taking a careful history, a physical exam, targeted laboratory tests and imaging studies, and neuropsychiatric testing. Much of the diagnostic procedure is used to rule out the presence of other illnesses because Alzheimer’s disease is a clinical diagnosis; it cannot be confirmed by laboratory testing or imaging.
The initial presentation of many patients who have Alzheimer’s can feature many of the signs and symptoms that were previously discussed. But approximately 20%-40% of all patients who have Alzheimer’s disease have an atypical presentation, and Alzheimer’s disease can be misdiagnosed as depression, stroke, or many other medical or psychiatric disorders. Alzheimer’s disease then is a progressive disorder and as patients move through the pre-clinical, mild, moderate, and severe stages the various impairments associated with the disease gradually worsen.

Activities of daily living become increasingly difficult and eventually, impossible. The patient cannot work, cannot socialize appropriately, cannot provide self-care, and the patient’s behavioral and emotional problems become unmanageable.

Table 1: Signs, Symptoms and the Stages of Alzheimer’s

<table>
<thead>
<tr>
<th>Stage</th>
<th>Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRECLINICAL</td>
<td>Development of the amyloid plaques and neurofibrillary tangles. The patient has no signs or symptoms of Alzheimer’s disease.</td>
</tr>
<tr>
<td>MILD ALZHEIMER’S DISEASE</td>
<td>Confusion, Delays in accomplishing simple tasks, Difficulty with simple tasks, i.e., handling money, following directions, Memory loss, Mood changes, Poor judgment</td>
</tr>
</tbody>
</table>
MODERATE ALZHEIMER’S DISEASE

- Aggressive behavior
- Coping problems
- Delusions, hallucinations
- Difficulty with thinking logically
- Difficulty recognizing family and friends
- Impulsive behavior
- Inability to learn new tasks
- Increasing confusion and memory loss
- Increased emotional lability
- Paranoid behavior and thinking
- Problems with reading, speaking and writing
- Problems recognizing friends and family members
- Shortened attention span
- Wandering

SEVERE ALZHEIMER’S DISEASE

- Inability to communicate
- Inability to perform self-care

Eventually physical impairments become so significant that the patient requires constant care. Patients typically succumb to immobility-related illnesses such as aspiration, infections, or pneumonia, usually within 8-10 years from the time of diagnosis.

It was mentioned previously that Alzheimer’s disease is the most common cause of dementia. Dementia is a commonly used and often misunderstood term and should be explained here. Dementia is a
syndrome, not a disease itself, and Alzheimer’s disease and dementia are not synonymous.

There are many causes of dementia, and the signs of dementia are an important part of the clinical picture of Alzheimer’s disease. Kane et al., (2013) define dementia as “... a clinical syndrome involving a sustained loss of intellectual functions and memory of sufficient severity to cause dysfunction in daily living,”19 while Seeley and Miller (2015) write that dementia “... is an acquired deterioration in cognitive abilities that impairs the successful performance of activities of daily living.”3 These definitions emphasize key points about dementia and Alzheimer’s disease.

First, an important distinguishing aspect of dementia is an inability to successfully perform the activities of daily living, caused by impaired cognitive and intellectual capacity. Second, dementia is a syndrome because there is a multitude of etiologies of dementia. The Diagnostic and Statistical Manual of Mental Disorders V (DSM-V) criteria for dementia are:20

1. Evidence of significant cognitive decline from a previous level of performance in one or more cognitive domains:
   - Complex attention
   - Executive function
   - Language
   - Learning and memory
   - Perceptual-motor ability
   - Social cognition
2. The cognitive effects interfere with independence in everyday activities. At a minimum, assistance should be required with complex activities of daily living such as managing medications or paying bills.

3. The cognitive effects do not occur extensively in the context of delirium.

4. The cognitive deficits are not better explained by another mental disorder (i.e., major depressive disorder, schizophrenia).

**Early Onset Alzheimer’s Disease**

Most cases of Alzheimer’s disease happen to the elderly, but early-onset Alzheimer’s disease accounts for approximately 5.5% - 7% of all cases of the disease.\(^2\) Early-onset Alzheimer’s disease is typically described as evidence of the disease in people who are under the age of 65, but there is no universally accepted definition for an age cut-off point.\(^2\) Approximately one-half of all cases of early-onset Alzheimer’s disease can be considered as inherited.\(^2\) However, although the genetics of this form of the disease is well understood, it is a dominantly inherited disease but not a fully penetrant disease.\(^2\)

As mentioned above, the early-onset form of Alzheimer’s disease has a more rapidly progressive course, and it appears to affect different areas of the brain than late-onset Alzheimer’s disease.\(^2\) The risk factors and the pathophysiological mechanisms may be distinct in the two forms, as well, and patients who have the early-onset form have been found to have a greater number of amyloid plaques and
Despite these differences, and the general observation that the clinical characteristics of early-onset and late-onset are separate, Palasí et al., (2015) noted that when early-onset and late-onset Alzheimer’s disease are closely examined “... there is no current consensus about which cognitive domains are more impaired in each group.”

Diagnosis Of Alzheimer’s Disease

The diagnosis of Alzheimer’s disease, as previously mentioned, is a clinical diagnosis, based on a physical examination, taking a careful health history, targeted laboratory tests and imaging studies, and neuropsychiatric testing. Because Alzheimer’s disease is a clinical diagnosis there can be some disagreement about what diagnostic criteria are applicable. The following criteria are from Kane, et al., (2013).

- Memory impairment and one or more of the following: Aphasia, apraxia, agnosia, and executive functioning deficits.
- Cognitive deficits that severely impair social and occupational functioning and are a major change from the previous level of functioning.
- The course of the cognitive deficits is gradual in onset and it continuously declines.
- The cognitive deficits do not occur during a period of delirium.
- The patient’s clinical condition is not accounted for by an axis 1 disorder such as major depression or schizophrenia, a systemic illness, or another progressive neurological disease such as a brain tumor or Parkinson’s disease.
Treatment Of Alzheimer’s Disease

Alzheimer’s disease cannot be cured, it can only be managed and doing so is a big challenge. If the patient has no significant co-morbidities, the patient will be relatively healthy in the physical sense and will be ambulatory until late in the progression of the disease. But for both patient and the patient’s caretakers, the cognitive deficits and the behavioral and emotional issues associated with Alzheimer’s disease - which in many instances are inextricably linked - can create enormously frustrating situations.

It is impossible to improve a patient’s memory, executive function, language difficulties; cognitive deficits cannot be reversed; the patient’s condition always declines; and behavioral and emotional problems will always occur. But with skillful application of environmental and psychosocial interventions and targeted, judicious use of medications, the patient who has Alzheimer’s disease can be safely and effectively cared for.

Drug Therapy

Drug therapy for the treatment of Alzheimer’s disease is intended to: 1) provide symptomatic relief from the physical and psychological complications; and, 2) slow the progression of the disease and/or alter the pathophysiologic mechanisms of Alzheimer’s disease.

Drug therapy for the treatment of Alzheimer’s disease will not be discussed in great detail. Medications can be helpful for providing symptomatic relief, slowing the progression (somewhat) of the disease, and addressing the pathophysiological mechanisms of these disease, but drug therapy is considered to be second-line treatment:²⁷
the preferred approach is environmental and psychosocial interventions. The generic names of drugs are listed first; trade names are in parentheses.

**Symptomatic Treatment**

A wide variety of medications have been used to provide patients with symptomatic relief from the emotional, physical, and psychological complications associated with Alzheimer’s disease including, but not limited to anti-depressants, anti-epileptic drugs, first and second-generation anti-psychotics, anti-parkinsonian drugs, anxiolytics, beta-blockers, calcium channel blockers, hypnotics or soporifics, and tricyclic anti-depressants.

While these drugs can and do provide some benefit, the evidence for their effectiveness in treating agitation, depression, psychosis, sleep disturbances, etc., in patients who have Alzheimer’s disease is modest or lacking. And although all drugs have a risk-benefit ratio, for some of the aforementioned medications such as the anti-psychotics and the tricyclic anti-depressants, the risks can be significant and they appear to greatly outweigh the benefits for this patient population.

**Disease Progression Slowing or Pathophysiology Alteration**

The two types of drugs that are used for this purpose are memantine (Namenda) and the acetylcholinesterase inhibitors donepezil (Aricept), galantamine (Razadyne), and rivastigmine (Exelon®). (Note: Tacrine [Cognex] is a cholinesterase inhibitor that was the first drug of this class that was used to treat Alzheimer’s. It is no longer available as its use caused severe gastrointestinal side effects and hepatotoxicity). Memantine is classified as an N-methyl-D-aspartate (NMDA) receptor
antagonist. This drug is a competitive antagonist of the NMDA type of glutamate receptor.

Glutamate is the primary excitatory neurotransmitter. It is thought that Alzheimer’s disease causes excessive stimulation of NMDA receptors, and this continued and excessive stimulation may be a cause of both cognitive impairments associated with Alzheimer’s disease and neuronal damage. Memantine has been reported to be effective at improving cognition, improving the patient’s ability to perform activities of daily living, and decreasing the level of agitation in patients who have mild to moderate Alzheimer’s disease.

Commonly seen side effects of memantine include confusion, constipation, dizziness, and headache. Memantine is usually dosed once a day and it is available as an oral solution, regular release, and extended release tablets. It is also available as a combination product with donepezil and this combination of memantine and donepezil (Namzaric) has been shown to be helpful.

The acetylcholinesterase inhibitors function by reversibly inhibiting acetylcholinesterase, the enzyme that is responsible for enzymatic degradation of the neurotransmitter acetylcholine. Alzheimer’s disease damages cholinergic neurons thus decreasing the production of acetylcholine, and this process is thought to be in part responsible for some of the clinical signs of Alzheimer’s disease. The acetylcholinesterase inhibitors have been reported to provide a mild to moderate level of improvement in cognition and global functioning.
There is no evidence that one of these drugs is superior to the other.\textsuperscript{37} Commonly seen side effects of therapy with the acetylcholinesterase inhibitors include diarrhea, nausea, and vomiting.\textsuperscript{38} These drugs are usually dosed once a day and are available as regular release tablets, transdermal patches, or disintegrating tablets.

Many other medications and supplements have been used to try and alter the course of Alzheimer’s disease. Oxidative stress and inflammation are part of the pathological process of Alzheimer’s disease. There is evidence that antioxidants such as vitamin E can slow the decline of the functional abilities of patients who have mild to moderate Alzheimer’s disease,\textsuperscript{39} but non-steroidal anti-inflammatories have not been shown to have any significant benefit for these patients.\textsuperscript{29,40}

Agitation, aggressive behavior, and psychosis are very common in patients who have Alzheimer’s disease. Atypical and conventional antipsychotics would seem to be the most intuitive choice in these situations, and these drugs are often used to treat these behaviors in patients who have Alzheimer’s disease.\textsuperscript{41} However, the antipsychotics - both atypical and conventional - can have significant side effects, \textit{i.e.,} antipyramidal effects, arrhythmias, hypotension, sedation, and an increased risk for mortality in elderly patients (possibly); the evidence for the effectiveness of these drugs in this clinical situation is modest, at best; and, they may be especially dangerous for elderly patients who have Alzheimer’s disease.\textsuperscript{42,43}
Environmental and Psychosocial Interventions

It is recommended that behavioral and environmental approaches should be used to treat neuropsychiatric behavior problems and emotional issues in patients who have Alzheimer’s disease. The commonly used psychotropic medications do not have Food and Drug Administration (FDA) approval for this purpose, and psychotropic medications should only be used for treating neuropsychiatric behavior problems and emotional issues in patients who have Alzheimer’s disease if:

- non-pharmacologic interventions have failed;
- the patient has major depression with or without suicidal ideation;
- the patient has a psychosis that is causing great harm or has the potential to do so;
- the patient is very aggressive and may harm him/herself or others.

It is often assumed that the neuropsychiatric behavior problems and the emotional issues that are so distressing and difficult are simply inevitable for patients who have Alzheimer’s disease. These problems do occur quite often and Alzheimer’s disease is their root cause, but the precipitating cause of agitation, aggression, inappropriate actions and speech, wandering etc., is almost always internal and/or external stimuli that are not obvious to family members, caregivers, and health care professionals.

The patient who has Alzheimer’s disease has cognitive deficits that affect the patient’s ability to cope, communicate, understand the
environment, and to provide self-care. These cognitive deficits and language impairments also mean that the patient with Alzheimer’s disease cannot express his or her needs or frustrations, and cannot organize an appropriate response to them. These issues combine to place the patient in a tremendous amount of stress, and the patient reacts.

The behavior and the language of someone who has Alzheimer’s disease may be difficult and inappropriate, but the patient is usually reacting to an identifiable stressor. Considering neuropsychiatric behavior problems and emotional outbursts as normal for a patient who has Alzheimer’s dementia is in one sense treating the patient as less than whole.

Learning Break:

Treatment and management of neuropsychiatric behavior problems and emotional problems in patients who have Alzheimer’s disease is an important part of their care. However, ensuring and attending to the patient’s comfort and safety is equally as important. It can be easy to focus on the aspects of Alzheimer’s care that is the most dramatic, i.e., managing psychotic behavior, but basic patient needs should not be neglected and doing so is likely to greatly attenuate the issues that are the most challenging to cope with.
The DICE Method

The optimal approach to neuropsychiatric behavior problems and emotional difficulties can be summarized very simply: make every effort to understand the situation from the patient’s point of view. Kales et al., (2014) note that the ideal approach is "... to conceptualize behaviors as stemming from unmet needs, environmental overload, and interactions of individual, caregiver, and environmental factors."27 A useful approach that has been developed is called the DICE approach: Describe, Investigate, Create, and Evaluate.35

The DICE approach is a systematic way of identifying and treating neuropsychiatric behavior problems. It begins with and operates under the assumption that such difficult management issues with patients who Alzheimer’s disease are caused by a stressor that can be identified and corrected, and that these issues can be solved with creativity and patience. The steps in the DICE method are explained below. In the example below, we review a patient exhibiting agitation but the DICE approach can be used for any problem that may arise between an Alzheimer’s patient and caregiver. In addition, the DICE approach can be used while an event is happening or retrospectively.

Describe

The staff, family member, or the caretaker reports that the patient has become agitated and aggressive and this behavior is new. In the first step of the DICE approach the clinician, caretaker, or family member should clearly describe the situation; simply reporting that the patient has become agitated and aggressive is not helpful without context. This step is not complicated, but an organized approach works best, so focus on who, when, what, and where.
• *Who* is there when the patient is agitated? The same person and only that person or can it be anyone?

• *When* does this behavior happen? Is it only at a specific time of the day, does it happen throughout the day, is it periodic in nature, or is it continuous?

• *What* is happening when the behavior occurs? This is probably the most important variable. Does the behavior happen during meals, when the patient is going to sleep, during bathing, or when a new person enters the room? Was the patient recently prescribed a new medication or does the behavior begin shortly after a dose of medication is given? Is the patient in a situation that could be described as frightening or threatening? The questions to ask can be nearly endless, but it is often obvious what the precipitating situation involves.

• *Where* relates to whether there are environmental conditions that may be precipitating the behavior? Is there a lot of background noise, a lot of people in the area (or too few), or a lot of new activity happening?

Additionally, has the patient been asked why she/he is upset and/or behaving in a certain way? Asking someone who has Alzheimer’s disease to explain feelings and motivations may not always be fruitful, but it should be done. It is important to listen to the patient. Is the patient making a specific complaint? What is the patient saying when the events(s) occur?
Investigate

The investigation stage of DICE is closely linked with the description stage, but one of the areas to focus on in the investigation stage is basic needs, i.e., comfort, hunger, presence of pain, etc. In addition, it is important to remember that many people who have dementia are elderly and have chronic medical problems. Neuropsychiatric behavioral problems are often caused by emotional or psychological stress, but the possibility of an acute illness or exacerbation of an existing one should always be considered.

- Check the patient’s temperature, blood pressure, pulse, and respiratory rate, if needed. Has the patient’s vision or hearing changed? Could the patient have developed a new medical issue?
- Is the patient incontinent of stool or urine?
- Could the patient be too cold or warm?
- Could the patient be hungry or thirsty?
- Is the patient’s position uncomfortable?
- Does the patient have an injury? The patient may have suffered an injury but is unable to tell anyone.
- Was the patient recently prescribed a new medication or does the behavior begin shortly after a dose of medication is given? Was the patient supposed to receive a dose of medication but the dose was not given?
- Could the patient be in pain?
- Has the patient’s daily activity schedule been changed or the patient’s sleep pattern disrupted?
• Is there anything about the physical and emotional interaction between the patient caretakers, family members, or staff that may be contributing?

Create

Creating a treatment plan should be a collaborative effort between nurses, other healthcare professionals and if they are involved in day-to-day care, the family members. The clinician needs to focus on the behavior that is problematic at the time, but also on root causes and prevention. Strategies for the two can be different. The patient who is agitated may need to be in a place that is quiet and away from others - an immediate solution - but underlying causes such as over-stimulation and pain need to be addressed. Specific problems that are easily identifiable such as a fever or incontinence can easily be treated. Finding creative solutions that address less obvious precipitating factors or ones not easily changed can be difficult.

Evaluate

In this final step, the creative solution is evaluated for its effectiveness, its negative and positive consequences, and how easy it was to apply. The interventions should also be routinely assessed to ensure they were successful, and if successful, that they are being done correctly.

Can Alzheimer’s Disease Be Prevented?

Alzheimer’s disease is devastating and there is no cure, so prevention of the disease is an area of intensely focused research. Han et al., (2014) note that disease prevention can be primary, secondary, or
tertiary. Primary prevention of Alzheimer’s disease focuses on modifiable risk factors and targeting the pathophysiological processes of the disease; secondary prevention focuses on early detection of the disease before clinical signs and symptoms begin; and, tertiary prevention focuses on changing the course of the disease to make it easier to live with and prevent complications.

Pharmacological approaches to tertiary prevention have been unsuccessful, early detection is still unreliable, and targeting the pathophysiological processes of the disease have not worked. The most promising approach to date is focusing on modifiable risk factors such as cardiovascular disease, diabetes, diet, hypertension, metabolic syndrome, physical activity, psychosocial issues such as depression and isolation, and smoking.

Changing behaviors in relation to these risk factors has undoubted health benefits. However, the evidence for the effectiveness of this approach in preventing Alzheimer’s disease, i.e., increasing physical activity directly decreasing the risk of developing Alzheimer’s disease, is far from unequivocal. The literature often describes an association between change in a specific behavior and change in the risk for Alzheimer’s disease, but as Sindi, et al., note (2015), when the evidence for preventive interventions is examined, it is considered inadequate.

Summary

Alzheimer’s is a chronic, progressive neurological disease that causes devastating cognitive impairments. The pathophysiological processes that are characteristic of Alzheimer’s disease, amyloid plaque deposits
and neurofibrillary tangles in specific areas of the brain, develop many, many years before the clinical signs and symptoms begin. Alzheimer’s disease primarily affects people who are 60 or older: age is one of the biggest risk factors for the development of the disease. The disease is well described in the pathophysiological and clinical sense, and thought to be caused by a confluence of environmental, genetic, and lifestyle issues and disease states, but it is still not clear how and when these interact to produce Alzheimer’s disease. Much about Alzheimer’s is still unknown.

There is no cure for Alzheimer’s disease and attempts at finding easily applied preventative measures have not been successful. The treatment for Alzheimer’s disease at this point focuses on symptomatic relief and to a lesser degree, altering or influencing several of the pathophysiological processes that are thought to cause the cognitive impairments. However, pharmacologic therapy has been relatively disappointing in its effectiveness, and environmental and psychosocial interventions are the preferred approach for care of the patient who has Alzheimer’s disease.

Please take time to help NurseCe4Less.com course planners evaluate the nursing knowledge needs met by completing the self-assessment of Knowledge Questions after reading the article, and providing feedback in the online course evaluation.

Completing the study questions is optional and is NOT a course requirement.
1. **Alzheimer’s disease primarily affects:**
   a. the elderly.
   b. men.
   c. the young.
   d. people between 40 and 60.

2. **True or false: Environmental risk factors are a proven cause of Alzheimer’s.**
   a. True.
   b. False.

3. **A family history of Alzheimer’s disease**
   a. has no influence on the risk for Alzheimer’s disease.
   b. only affects women in terms of risk for Alzheimer’s disease.
   c. only increases the risk if the patient has diabetes and hypertension.
   d. significantly increases the risk for Alzheimer’s disease.

4. **Which of the following are risk factors for Alzheimer’s disease?**
   a. Chronic obstructive pulmonary disease and hepatitis.
   b. Acute kidney disease and anticoagulation with warfarin
   c. Hypertension and diabetes.
   d. Atrial fibrillation and long-term use of anti-depressants.

5. **Alzheimer’s disease is characterized by:**
   a. cerebral emboli and hyper-coaguability.
   b. vasospasm and Lewy bodies.
   c. cerebral edema and amyloid plaques.
   d. amyloid plaques and neurofibrillary tangles.
6. **The pathologic lesions of Alzheimer’s disease**
   a. begin many years *before* clinical signs begin.
   b. differ significantly in nature from patient to patient.
   c. begin *after* the clinical signs are evident.
   d. can spread to the peripheral nerves.

7. **One of the earliest and most prominent signs of Alzheimer’s disease is:**
   a. Incontinence.
   b. Memory loss.
   c. Aphasia.
   d. Inability to perform self-care.

8. **True or false: Anti-psychotics are very safe and effective treatment for Alzheimer’s disease.**
   a. True.
   b. False.

9. **Which of the following drugs are *commonly* used to treat Alzheimer’s disease?**
   a. Beta blockers and benzodiazepines.
   b. Antihistamines and MAO inhibitors
   c. Memantine and acetylcholinesterase inhibitors.
   d. Anti-depressants and calcium channel blockers.

10. **Alzheimer’s disease can be definitively diagnosed with laboratory tests.**
    a. True.
    b. False.
Correct Answers:

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REFERENCE SECTION

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