

REVIEW



A comprehensive review of dementia: An overview of Alzheimer's disease, including risk factors, clinical classification, diagnosis, management, treatment and caregiving strategies

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ABSTRACT

Dementia is a general term for different diseases that affect language, attention, thinking, executive function, memory and daily activities. Alzheimer's disease (AD) is the most prevalent type of dementia, contributing 60 to 80% of the cases globally. This review discusses dementia in depth, with particular emphasis on AD, addressing its medical analysis, categorization, diagnostic techniques, management strategies, treatment options and caregiving considerations. A thorough study of these components is critical for early diagnosis and detection, optimal management, enhanced clinical results, and optimized quality of life for patients and radiologists. This review focused on providing detailed assessments of AD by examining its risk factors, medical prediction, diagnostic approaches, administrative mechanisms, and treatment and caregiving practices based on current scientific evidence. The adopted literature was assessed to recognize current findings relating to epidemiology, pathophysiology, diagnosis, therapeutic interventions, and caregiving mechanisms for AD. The clinical findings show accurate investigations, neuroimaging approaches, laboratory examinations, and biomarker analysis. The reviewed literature indicates that AD remains a difficult and multifactorial neurodegenerative ailment requiring early diagnosis, individualized treatment, detail risk factor management, and multidisciplinary care. Further research into disease strategies, novel biomarkers for early diagnosis, preventive measures, and more effective therapeutic methods is critical to overcome the increasing global burden of AD.

KEYWORDS

Caregivers; Frontotemporal; Traumatic encephalopathy; Alzheimer's Disease (AD); Cognitive Impairment; Neurodegenerative disease

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Introduction

Dementia is caused by many different diseases or injuries that destroy the brain. Dementia may be caused after a stroke or certain infections like HIV, due to misuse of drugs like alcohol, or recurring physical injuries to the brain known as chronic traumatic encephalopathy, or poor nutrition. The worldwide burden of dementia is rising because of aging populations and genetic factors, making it a significant public health concern. Ingelin et al. discuss as the population of older adults in Norway continues to increase, the prevalence of dementia and cognitive impairment is also growing rapidly [1]. This trend emphasizing the need for novel and more efficient methods to assist research, improve diagnostic triage, and attain effective brain health interventions within the community.

In his study examined that prevention of dementia begins with handling the factors that affect brain health across life [2]. Recent developments in dementia research have generated valuable insights into the prevention, early recognition, and management of the disease. These scientific achievements offer new opportunities to minimize the risk of dementia

AD affects families, individuals, the healthcare system and economies. Different forms of dementia include AD, vascular dementia, frontotemporal dementia and dementia with Lewy bodies [3]. AD is characterized by the abnormal accumulation of amyloid-beta plaques and tau protein tangles in the brain, which lead to neuronal degeneration and progressive impairment of cognitive function [4].

AD is the most common form of dementia, with almost 90% of cases worldwide [5]. AD includes a wide range of signs and symptoms, not limited to depression and anxiety. Anorexia, sleeplessness, psychosis and so on. As biomarkers and therapeutic options for AD continue to advance, accurately identifying the optimal time for individualized therapeutic intervention has become increasingly important

Magnetic Resonance Imaging (MRI) can be used as a diagnostic tool for neurological assessment, which identifies scenarios where plasma biomarkers were at best predicting cognition and where its benefit is significantly better than other diagnostic tools [6]. Figure 1 is an illustration of disease progression.

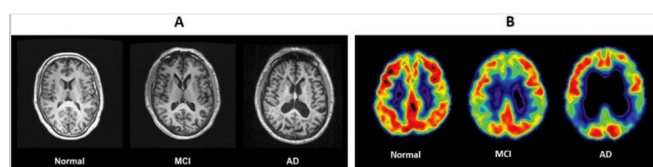


Figure 1. MRI scans of different progression of AD [7].

Objective

This comprehensive review aims to present different forms of Dementia, an overview of AD including risk factors, medical categorization, diagnosis, management, treatment and cognitive strategies

Methods**Forms of dementia****20 common types of dementia-related disease**

Dementia disrupts the ability to perform daily activities; dementia isn't forgetting where you put your key; however, a patient with dementia can have situations like not knowing what the key is used for.

There is no definitive list of dementia-related diseases, but over 100 different conditions can cause it. Some of the prevalent forms of the disease are [8,9]:

Alzheimer's disease: This is the most common form of dementia. AD leads to brain cells(neurons) being damaged and eventually dying. Over a period, the brain shrinks, particularly the hippocampus, that are important for memory. The cause of this disease can be linked with a combination of factors like abnormal protein buildup in the brain, age, genetic factors and so on. Approximately 60% to 80% of patients with dementia have this type.

Vascular dementia: Vascular dementia is the second most common form of dementia. It occurs when the brain cells are damaged due to insufficient blood supply to the brain. This is caused by conditions after a stroke that

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block and damage blood vessels in the brain. Symptoms include confusion, trouble concentration, inability to complete a task and memory problems. The common risk factors include high blood pressure, diabetes, and high cholesterol levels. About 15% to 25% of the people with dementia have vascular dementia.

Lewy Body Dementia (LBD): It involves conditions due to the buildup of clumps of protein called Lewy bodies in the brain's cells, which interfere with normal brain function. It's a progressive brain disorder that affects thinking, mood, behavior and, movement, visual hallucinations and delusions. It occurs due to Lewy bodies age, genetics and other brain conditions.

Frontotemporal Dementia (FTD): It damages the frontal and temporal lobes of the brain, which are responsible for personality, decision-making, language skills (speaking, understanding or forgetting the meaning of common words) and behavior. The damage is caused by the buildup of abnormal proteins in these areas, genetics and age. FTD is responsible for early dementia commonly occurring in people between the ages of 45 and 64; about 5% to 6% of all dementia cases are FTD.

Parkinson's disease dementia: This is a progressive neurological disorder that affects movement. People with Parkinson's disease later develop Parkinson's disease dementia. The symptoms include trouble thinking and memory, hallucinations, depression and problems with speech. The causes are Loss of dopamine, genetics and age. Abnormal protein buildup (Lewy Bodies) may also play a role.

Mixed dementia: This is a type of dementia that occurs due to a combination of one or more types of dementia. The most common combination is AD and vascular dementia. The decline in patients with this dementia is faster compared with patients with one type. It's also attributed to difficulties in diagnosis because symptoms of different dementia often overlap, and this is common among people of 80 years of age and above.

Creutzfeldt-Jakob Disease (CJD): It's a neurodegenerative condition caused by an abnormal infectious protein called prions. These prions build up together and cause nerve cell death in your brain. Symptoms include communication, planning, confusion, depression and judgement. Most cases are caused by sporadic CJD (sCJD), Genetic (Familial) (fCJD) and acquired (Iatrogenic or Variant) (vCJD).

- Sporadic CJD (sCJD): This occurs randomly with no known risk factor, which is caused by spontaneous misfolding of the normal prion protein (PrP^C) to form a pathogenic form (PrP^{Sc}). It affects individual with age range of 60 – 65 years old.
- Genetic (Familial) (fCJD): This type is caused by mutations in the PRNP gene which encodes the prion protein. It affects people around 50 years of age.
- Acquired (Iatrogenic or variant) (vCJD): This occurs from medical procedures that are contaminated, such as corneal transplants or human growth hormone injections from cadavers. It affects people of age less than 50 years.

Normal Pressure Hydrocephalus (NPH): This is a type of dementia caused by abnormal buildup of cerebrospinal fluid (CSF) in the ventricles of the brain despite the fluid pressure appearing normal on measurement. The excess buildup affects the brain. The dementia is caused by brain injury, brain infection, brain bleed or previous brain surgery. The symptoms of the disease include mood swings, frequent falls or loss of control and poor balance.

Wernicke-Korsakoff Syndrome: This is a type of dementia caused by deficiency of vitamin B1(thiamine). This may lead to bleeding in the key areas of the brain. The most common cause of this disease is chronic alcohol misuse; however, it can also be caused by malnutrition and serious illnesses like HIV/AIDs and cancer. The symptoms include difficulty remembering things, difficulty processing information, learning new skills, double vision and loss of muscle coordination.

Neurosyphilis: This is a dementia that is mostly caused by long-term infection of the brain by the syphilis. This happens when untreated syphilis caused by Treponema pallidum damages brain tissue by spreading. Also called general paresis of the insane (GPI) in the late stage of the disease. The causes of neurosyphilis dementia include untreated syphilis infection (Primary cause), delayed diagnosis, a weak immune system, high-risk exposure

through unprotected sexual contact and inadequate treatment.

Progressive Supranuclear Palsy (PSP): It's a form of dementia that affects movement, balance, eye movements and thinking. When it involves cognitive decline in the patients, it leads to PSP dementia. This is characterized by poor attention and planning, personality changes and difficulty with decision-making. It's caused by abnormal tau protein buildup, degeneration of specific areas of the brain, an unknown exact trigger and age-related risk.

Huntington's disease: This is a type of disease caused by inherited brain decline that causes progressive degeneration of the nerve cells, particularly in the part of the brain that controls behavior, thinking and movement. This also leads to a combination of movement problems, cognitive decline and psychiatric symptoms like depression. Some of the causes are genetic mutations, inherited faulty genes and brain cell degeneration.

Chronic Traumatic Encephalopathy (CTE): This type of dementia is a progressive brain disorder that occurs from repeated blows to the head that cause brain injury. This is most common among boxers, soldiers, football players and people in vehicle accidents. It leads to poor judgment, mood and behavior, poor concentration and memory loss. It is caused by repeated head trauma, abnormal tau protein buildup, long-term exposure to risk activities and poor injury management.

HIV-Associated Neurocognitive Disorder (HAND): This is caused by infection of the brain by HIV/AIDs virus. Some of the causes include HIV infection of the brain, immune system weakening, chronic inflammation, aging with HIV and incomplete viral suppression.

Posterior Cortical Atrophy (PCA): This is a type of dementia that affects the posterior(back) part of the brain, particularly areas related to vision and visual processing. The causes of this dementia include AD pathology, abnormal protein buildup, and degeneration of posterior brain regions.

Primary Progressive Aphasia (PPA): This is a little-by-little decline in neurological condition characterized by consistent loss of speech abilities. The symptoms of people with this disease include difficulty speaking, difficulty understanding and difficulty in reading or writing. It's caused by abnormal protein accumulation and neurodegenerative brain disease, and degeneration of specific brain regions.

Wilson's disease: It is a type of disease caused by buildup of copper due to a defective ATP7B gene, which affects the brain, eyes and liver. Wilson's is an inherited condition where copper builds up in the body due to inability of the liver to excrete it into bile. In the long run, the excess copper damages tissues and organs. This type of dementia is autosomal recessive, which implies a person must inherit two defective copies of the gene, one from each parent, before the disease can affect the patient. The causes of this disease can be genetic mutation, copper accumulation and autosomal recessive inheritance.

Corticobasal Degeneration (CBD): This is a progressive neurodegenerative disorder that affects the cortex and basal ganglia, movement and cognition. It leads to a combination of movement problems and cognitive difficulties. The main cause of this disease is not fully understood but is related to the accumulation of tau protein in the brain, age, and environmental and genetic factors.

Metabolic or toxic dementia: This is a type of dementia described as a cognitive disorder resulting from metabolic disturbances or exposure to toxic substances that disturb normal brain functions. The metabolic causes of the disease include liver disease, hyperglycemia, thyroid disorder, Kidney failure and vitamin deficiencies; the toxic causes are directly harmful to neurons, like alcohol, heavy metals, drugs and medications and recreational drugs

Autoimmune Encephalitis (AE): This is a type of dementia where the body's immune system targets neurons or other brain components, leading to inflammation and impaired brain function. It can be caused by autoantibodies, post-infection triggers, idiopathic and paraneoplastic causes.

Alzheimer's disease overview

AD was first described in 1906 by a German psychiatrist called Alois Alzheimer's [10]. It's the most rampant form of dementia and can be described as a progressive neurodegenerative disorder marked by cognitive and functional decline disease consists of neurofibrillary tangles and neurotic plaques due to Amyloid-beta (Aβ) peptides accumulation in the central part of the brain.

The distinction between healthy brain tissue and that affected by AD is illustrated in Figure 2. In AD, brain tissue volume declines, little by little over time, followed by enlargement of the ventricle and marked shrinkage of the cerebral cortex and hippocampus.

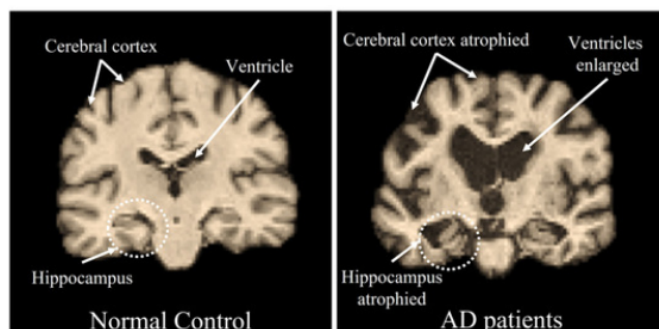


Figure 2. Healthy vs. diseased brain structure [11].

AD is recognized by buildup of amyloid plaques and neurofibrillary tangles. When these structures form in abnormal manners, it decreases the population of functional neurons and affects communication between brain cells, leading to progressive neural damage. [11]. The degeneration leads to atrophy of the hippocampus and other brain lobes, together with brain ventricles.

Different stages of Alzheimer's disease

The disease progresses gradually over several stages, each marked by worsening cognitive and functional decline. Disease affects everyone differently, and it's commonly divided into six stages based on the Global Deterioration Scale (GDS).

The 7 Stages of Alzheimer's disease based on the GDS

AD represents a critical global health issue, disturbing millions of individuals globally. The GDS provides a model for learning the progression of the disease by predicting its progression into seven distinct stages, beginning from normal cognitive function to severe cognitive decline [12-15].

The progression of AD starts years before noticeable signs appear, during a phase known as preclinical AD. Learning these stages is important for patients, caregivers, and healthcare professionals to promote early planning, regular management, and realistic expectations concerning disease progression and care needs [12-15].

The following are the stages of the disease's progression:

Alzheimer's stage 1: No cognitive impairment

At this stage, there are no noticeable symptoms of cognitive impairment or memory loss. The victim functions normally in their daily lives, and neither they nor those around them can notice any signs of problems with memory or thinking. Everything appears normal, with changes only becoming glaring in later stages.

Alzheimer's stage 2: Very mild cognitive decline

This stage is marked by very mild cognitive decline. The victim may sometimes forget names, replace daily items, or notice minor memory lapses. Consequently, these signs are not severe enough to be diagnosed as dementia. Family and friends may observe subtle changes, though they are often mistaken for normal age-related activities.

Alzheimer's stage 3: Mild cognitive decline

Mild cognitive decline becomes more noticeable at this stage. A person may be experiencing more regular memory lapses, challenges concentrating, and problems remembering some names or following instructions. These actions become gradually apparent to family and friends and may begin to affect daily activities.

Alzheimer's stage 4: Moderate cognitive decline

The individual notices moderate cognitive decline, making tasks such as managing finances or preparing meals gradually difficult. The daily operations become more difficult to accomplish, especially those made up of multiple phases; they need greater assistance from caregivers.

Alzheimer's stage 5: Moderately severe cognitive decline

Critical memory impairment becomes evident at this stage. The victims may forget important personal information, including their home address, their names, phone number and often have challenges carrying out simple calculations. These problems increase gradually; caregivers play a vital role in assisting with daily activities.

Alzheimer's stage 6: Alzheimer's symptoms: Severe cognitive decline

The victim at this stage experiences severe cognitive decline. They are likely to forget the names of close family relations, find it difficult to carry out daily activities including dressing, and exhibit noticeable changes in personality and behavior.

Alzheimer's stage 7: Alzheimer's disease: Very severe cognitive decline

The individuals at this stage experience very severe cognitive decline. Communication becomes very difficult, and they need assistance with nearly all daily operations, like eating, toileting, and personal hygiene. Caregivers provide detailed assistance to confirm the individual's comfort, safety, and dignity.

The knowledge of these different stages assists caregivers and families in preparing for the future. It allows them to provide the right assistance and care. This way, we can make life suitable for those with AD.

Alzheimer's Association pointed out that earlier research linked this higher risk to females, as females live longer than males since age is a key risk factor of the disease [10]. The disease progressively worsens over time; individuals diagnosed with the disease typically live about 4 to 8 years afterwards. Life expectancy can also depend on several factors, and AD patients may live as long as 20 years following the diagnosis.

Risk factors

These can be described as the condition that leads to the development of dementia diseases. They can be changed (modifiable) or cannot be changed (non-modifiable). Approximately 70% of the risk of developing AD is attributed to genetic factors. Early-onset AD is majorly caused by mutations in the APP, PSEN1, and PSEN2 genes, which encode amyloid precursor protein, presenilin 1, and presenilin 2, respectively [16,17].

Risk factors that cannot be changed (non-modifiable)

Advanced age: Age is the most common risk factor of dementia. Dementia risk increases with age after 65 years. As brains age, it accumulates protein deposits and vascular changes that lead to neurological decline and impair brain function.

Genetics and family history: Genetic mutations and gene variance have been linked to an increased risk of developing dementia. Genes like APOEε4 are strongly associated with AD. People with a family history of dementia have all the likelihood of developing the condition.

Sex: Sex is another common risk factor of developing dementia; women have a higher risk of dementia compared to men because they live longer, and because of hormonal differences, they are at a higher risk.

Down syndrome: Another important risk factor of dementia is in individuals who have Down Syndrome. This person has great risk of early-onset AD (AD) because of extra copies of chromosome 21 that contain the amyloid precursor protein gene.

High blood sugar level: Individuals with diabetes have a great chance of developing dementia soon because the study has demonstrated that increasing blood sugar levels can result in deteriorating effects on brain health and increase the risk of cognitive impairment.

Risk factors that can be changed (Modifiable)

They explored some of the risk factors of dementia that can be changed; the research shows some of the risk factors can be influenced through lifestyle or medical management to reduce the risk of the disease, which includes [18-20]:

Obesity and overweight: People with obesity and overweight have a higher risk of dementia soon. Obesity is not a direct cause of dementia; however, a major risk factor through metabolic, vascular and inflammatory pathways. Managing weight through a balanced diet, exercise and lifestyle changes in middle age can reduce future dementia risk factors.

Smoking: Smoking tobacco can harm the lungs, heart and affect brain health. Research has shown that a person smoking tobacco products is at a great risk of developing dementia in future. The consequences of smoking lead to multiple mechanisms by which smoking contributes to pathology that grows to dementia.

Smoking is a preventable risk factor for dementia; avoiding smoking can reduce the chance of having cognitive decline in future.

Hearing loss: Individuals with hearing impairment have a significant risk of developing dementia, particularly older adults. Hearing loss affects brain health. This can be changed by treating hearing impairment on time to reduce the risk of dementia in future.

Glaucoma: Glaucoma is an eye impairment that is a disorder of neural tissue within the optic nerve that leads to blindness. Research has demonstrated that glaucoma is more than an eye disease; it consists of neurodegenerative links to dementia. Controlling glaucoma by treating it on time can reduce the chance of developing dementia in future.

Noise pollution: This is an environmental risk, which can lead to cognitive decline and dementia, especially in cities. A person in an environment where there is accumulation of noise pollution is at great risk of developing dementia in future. The study has inferred that a noisy environment accumulated over time can affect brain health. Addressing the issue of environmental pollution is a way of reducing the chance of developing dementia by protecting long-term cognitive health.

Air pollution: Air pollution is one of the common risk factors of developing dementia. The research has linked polluted air to long-term brain malfunction and cognitive disorders. Air pollution influences the brain through inflammation, oxidative stress and toxic protein accumulation. It's modifiable; reducing exposure to large amounts of air pollution can reduce the chance of developing dementia in later years.

Depression: One of the common risk factors of dementia is depression. Depression is an abnormal change in brain functionality that can result in dementia. The research study has shown that depression can act as a cause and early warning sign of dementia; depression can lead to dementia, and dementia as well can lead to depression. AD is one of the types of dementia that can be caused by the complexity of depression. Early treatment of depression with therapy, medication, mental stimulation and regular physical activity can help reduce the risk of developing the disease.

Physical inactivity: Physical Inactivity can serve as a risk factor for dementia; researchers have demonstrated that improving physical activity levels is linked to a diminished risk of dementia, particularly AD. Physical exercise can also improve psychiatric symptomatic indicators via cognitive function. Researcher also shown that physical exercise is important in preventing AD and other related dementia diseases.

Head trauma: This happens when there is a repeated blow to the head, which can disrupt normal brain function. This is a well-established risk factor of dementia. This action can lead to long-term structural and chemical changes that gradually impair memory, thinking and behavior. Prevention is possible to protect long-term brain health and prevent the risk of dementia.

Dietary factors: Several studies have confirmed that, as one advances in age, diet affects cognitive capacities and ultimate susceptibility to dementia, especially AD. Dietary factors are one of the common risk factors in developing dementia. This factor is preventable and can be activity control, controlling it can either protect or harm brain health as one age increases.

Clinical classification

The symptoms of AD progressively worsen over time; the rate at which the progression varies from one person to another. The classification is divided into three stages that reflect Cognitive Normal (CN), Mild Cognitive Impairment (MCI) and AD, as shown in Figure 3 and 4.

Normal Cognitive

In the early stage of dementia, especially AD, the patients can still function and do things independently; the person can work, cook, drive, and be part of social activities. Despite all these, the person might still have challenges of memory lapses (like forgetting recent actions or conversations), trouble planning, misplacing items, difficulties in completing complex tasks, difficulty finding words and inability to think and speak normally. At this stage, the symptoms might not yet be noticed except by the closest ones,

Alzheimer's Symptoms



Figure 3. Alzheimer's disease Symptoms [20].

like wife, husband, friends and children; the medical expert needs to diagnose and confirm the presence of AD.

Mild Cognitive Impairment (MCI)

The middle stage of AD is the longest stage that shows the transitional stage between cognitive changes and dementia. People in this stage experience noticeable cognitive changes that are more than the first stage. At this stage, the victim requires more support in executing daily tasks such as working and speaking. The AD patient's symptoms are more apparent; the person gets angry and frustrated quickly, confuses words when speaking, is unable to bathe and eat regularly by themselves, cannot perform tasks without assistance, forgets events or personal history, mental challenges in situations, changes in sleeping patterns, and appears repetitive in behavior.

The person in this stage can still participate in daily activities with assistance; it is important to find out what the person can do and simplify tasks. More intense care and support are needed by the patient in this stage

Alzheimer's disease

In the last stage of the classification of the disease, symptoms of dementia are very severe, and the person needs more extensive care. The patient cannot respond to the environment and surroundings easily, can no longer carry out conversation effectively, cannot control movement, in ability to sleep well during the night, communicating pain becomes difficult and becomes vulnerable to different kinds of infections like pneumonia.

During this stage, caregivers may want to use support services like hospice care, which focuses on giving adequate care and support to the patients till the end of life.

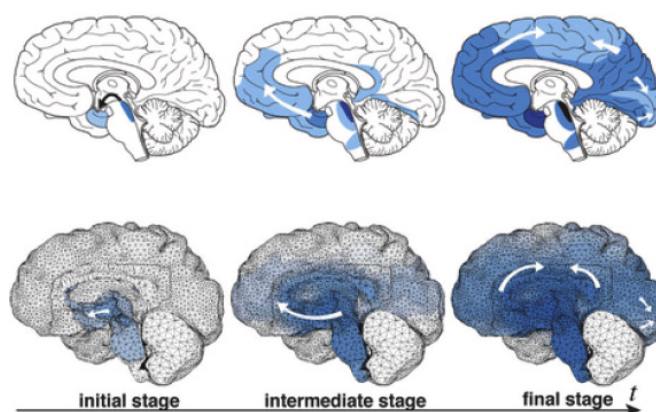


Figure 4. Pictorial representation of different stages of AD [21].

Alzheimer's disease diagnosis

Several methods can be used to diagnose AD; the most common diagnosis methods are clinical assessment, laboratory tests, and neuroimaging.

Clinical test

The diagnosis of AD is basically a clinical test that is done by the combination of family history, cognitive testing and physical examination. Radiologists assess the patient's memory loss and thinking skills, and functional assessment.

Laboratory tests

These are blood tests that are not the best diagnosis of AD because they exclude other conditions that mimic dementia. This type of diagnosis cannot confirm AD; however, it is essential to rule out reversible causes of dementia.

Neuroimaging

This is used to provide structural and functional evidence to support an AD diagnosis; it is used to recognize early disease markers of the AD diagnosis.

Structural imaging: This includes tools like MRI (Magnetic Resonance Imaging) or CT (Computed Tomography). MRI is better than CT because better resolution of soft tissue is captured more than exact size of hippocampal atrophy.

Functional imaging: This includes tools like FDG-PET (Fluorodeoxyglucose Positron Emission Tomography), SPECT (Single Photon Emission Computed Tomography)

Diagnosis of AD is primarily clinical, with Labs and imaging used to support the diagnosis and rule out other causes

Management of Alzheimer's disease

AD can be managed by concentrating on slowing cognitive decline, focusing on symptom control for improving quality of life. Traditionally, there is no cure for AD and other dementias; it only involves medications, non-drug strategies and supportive care.

Medications

Medication in the management of AD is an act of, and this can be classified into cognitive symptoms and behavioral and psychiatric symptoms

Cognitive symptoms

- Cholinesterase inhibitors – Cholinesterase inhibitors can be used to enhance memory and thinking by increasing acetylcholine.
- NMDA receptor antagonist – This helps to moderate AD by regulating glutamate activity.
- Combination therapy – This is used to combine Cholinesterase inhibitors with memantine

Behavioral and psychiatric symptoms

- Short-term use of antidepressants (for depression) – Depression diminishes cognitive resilience and promotes conditions that favor dementia. To manage depression early is an important step in protecting brain health.
- Antipsychotics may be used for severe agitation

Non-drug interventions

- Cognitive stimulation therapy – This is used to exercise memory and problem-solving activities
- Physical activity – The researchers have demonstrated that physical exercise can reduce risk of dementia, especially AD. Walking and light exercise can improve brain health.

Caregiver and supportive strategies

1. The medical expert can educate family or close associates of the patients about disease progression
2. Maintain a safe home environment to prevent falls and accidents of the victims.
3. Proper counselling and provision of emotional support for the affected patients
4. Treat all diseases that can lead to the development of dementia-like hearing/visions and sleeping disturbances.
5. Pay more attention to health challenges, including diabetes, cholesterol and hypertension.
6. Regular follow-up to adjust therapy and monitor complications is essential.

Alzheimer's disease prevention

Prevention is better than cure, although there is no cure for AD and related dementia yet. There is no genuine way to completely prevent the disease; however, research evidence has demonstrated that cognitive decline associated with the disease can be reduced by targeting health factors and lifestyle. O'Donnell examined the primary prevention focused on how to reduce the number of individuals who develop AD by overcoming risk factors before the disease starts [22]. These risk factors are predicted as either non-modifiable or modifiable. Non-modifiable risk factors, like age and genetics, cannot be modified, whereas modifiable risk factors, such as lifestyle and health-related factors, can be changed to lower the danger of developing the disease.

Eat a healthy brain diet

There are some diets that, if taken regularly, can reduce the risk of the disease. Some of the diets that reduce disease progression are shown in Figure 5.



Figure 5. 10 Healthy brain diets [23].

Exercise regularly

Dementia occurs when there is damage to the brain cells and blocked blood flow to the brain. Physical exercise enhances proper blood flow to the brain and diminishes inflammation. Physical exercise protects the person from cardiovascular disease, which is closely linked to AD risk. Physical exercise includes walking, swimming and cycling; one should ensure at least 150 minutes per week.

Prioritize good sleep

AD develops when there is accumulation of protein in the brain; inadequate sleep has been linked to buildup of harmful protein or excess in the brain. Try to sleep for 7-9 hours per night; during deep sleep, amyloid plaques linked to AD are cleared from the brain.

Manage chronic health diseases

The conditions that affect blood vessels negatively also damage brain tissues. These include high blood pressure, obesity, diabetes, and high cholesterol.

Keep the brain active all the time

Engaging the brain in activities helps to strengthen it; this will enhance the brain's ability to cope with damage over time. Involving the brain in activities like reading, writing, engaging in problem-solving tasks, games or puzzles and new talents or skills enables the brain to always stay resilient.

Stay connected socially

Interaction with people reduces the risk of cognitive decline risk, join community activities, attend ceremonies, make more friends and unite strongly with the family.

Harmful habits should be avoided

Drinking too much alcohol or taking too much tobacco can destroy brain cells. These two habits play an essential role in the health of the brain. To maintain brain health and reduce the risk of AD, avoid smoking and drinking alcohol entirely.

Mental health protection

Avoid too much stress on the brain with worldly things; too much stress can lead to depression, and a depressed person is at risk of developing AD. Seek help with depression and stay mentally active.

Avoid brain injury

Head Injuries should be avoided; individuals like athletes, boxers, footballers, and accident victims should seek necessary treatment as and when due and always go for brain examination from time to time, as this can help reduce the risk of having AD (Figure 6).

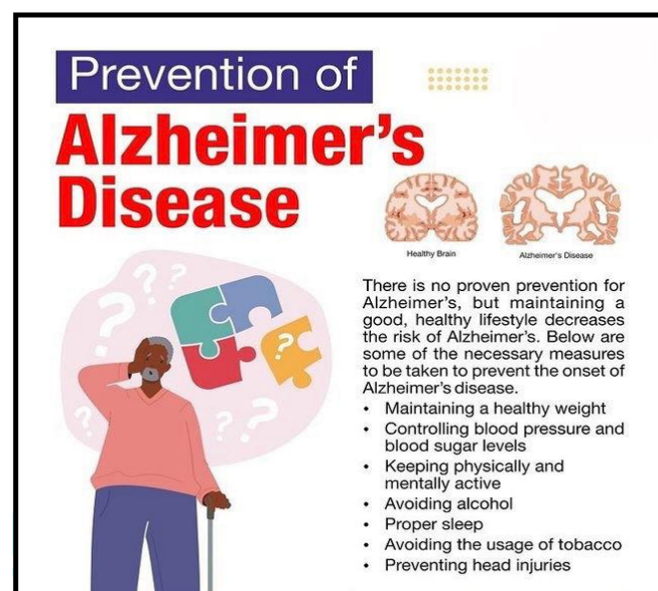


Figure 6. Prevention of Alzheimer's disease [23].

Treatment of Alzheimer's disease

AD requires a combination of medication and non-drug methods to reduce cognitive decline. The following breakdown can help in treating dementia.

Pharmacological treatments

Enhancement of Cognitive Decline: These drugs are used to enhance memory, thinking and daily functioning of the patients. The drugs include Donepezil, Rivastigmine, Galantamine and Memantine.

Drugs for behavioral and psychiatric symptoms: Agitation, depression, sleep disturbance and aggression are symptoms of AD; these drugs can be applied to reduce the rate of AD progression, which include:

- Antidepressants are used for depression and anxiety
- Anxiolytics for severe anxiety or agitation.
- Antipsychotics are used for aggression and psychosis.

Non-pharmacological treatments

Cognitive Interventions: The cognitive interventions for AD include memory exercises, puzzles, and discussing experiences to stimulate memory and problem-solving.

- Physical Activity and Lifestyle:
- Physical exercises improve brain health and reduce cognitive decline
- Regular balanced diet supports brain health.
- Interaction with family and peers diminishes depression and isolation
- Early detection, diagnosis and intervention yield the best outcomes.

Caregiving strategies

Appropriate and regular caregiving approaches focus on support, safety, communication and maintaining quality of life. Caring for patients with Alzheimer's disease can be challenging because the condition disturbs the daily activities of the patients, thinking, memory and speaking. Caregiving approaches include:

Create a safe environment

The environment where the patient of Alzheimer's disease is being treated is very important. Remove hazards in the home to prevent falls, like loose rugs, clutter and cords, use good lighting to reduce confusion, label rooms, cabinets, drawer and every object to help the patients identify the different objects and install safety lock on doors.

Communication system

Effective communication is one of the supportive tools needed by the patients. Speak slowly and clearly to patients by using short words and short sentences; always maintain eye contact, and a front approach of the person is necessary. Don't argue to avoid creating unnecessary confusion; use visual cues to help the person better understand

Caregiver self-care

The caregiver of the person with Alzheimer's disease is very stressful; caregiver self-care and maintaining their own physical and emotional health is important. Learn stress reduction techniques like exercise, medication and hobbies. The caregiver needs to learn more about the AD progression to anticipate the challenges.

Managing daily living activities

Assist with bathing, dressing, eating while promoting independence, encourage regular physical activities to maintain mobility. Caring for AD requires patience, empathy and planning.

Discussion of Literature Review

After a thorough review of dementia disease, we can infer that Alzheimer's disease is the most prevalent, with a progressive decline in memory and cognition, and the most challenging disease to manage. Dementia comes in different forms, such as vascular dementia, Lewy body, Parkinson's and mixed dementia.

There is no cure for the disease; however, adequate management and treatment approaches can slow down the rate of progression and enhance quality of life. Caregiving and supportive interventions are essential for the Alzheimer's disease patient's condition and diminishing caregivers' stress.

Conclusion

Alzheimer's disease, which is the most prevalent type of dementia, is a worldwide health challenge with critical clinical and societal implications. The research has demonstrated that there is no cure for the disease; however, early diagnosis and detection, adequate medical management, and appropriate caregiving approaches reduce cognitive decline and enhance patient quality of life. A multidisciplinary approach involving government agencies, non-governmental organization, community support, caregivers, and healthcare providers is important in addressing growing difficulties of the disease going forward. More research and findings on dementia, especially Alzheimer's disease. There is hope for offering modifying therapies for the disease in future.

Disclosure Statement

No potential conflict of interest was reported by the author.

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