THE SEAT OF THE MIND IS NO EXCEPTION: UNRAVELING THE MYSTERY OF OLD TIMER'S DISEASE

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Abstract

The brain, a vital organ for memory, emotions, decision-making, and intellect, is susceptible to age-related conditions such as Alzheimer's disease (AD) and vascular dementia. This study aims to unravel the history and impact of AD, determine its prevalence and risk factors, and explore its management and preventive strategies. Alzheimer's disease, the most common form of dementia, accounts for approximately 70% of all cases. Late-onset AD typically occurs in individuals aged 65 and above. Key risk factors include age, depression, diabetes mellitus, head injuries, physical inactivity, substance abuse, alcoholism, and genetic predisposition. The disease results from the accumulation of beta-amyloid plaques and neurofibrillary tangles, which disrupt brain function and cause cell death. Although AD has no cure, early detection and management can improve patient outcomes. Medications like galantamine and Memantine may temporarily maintain mental abilities, while physical activity supports brain and heart health. Nursing implications emphasize early symptom identification, evidence-based interventions, and a growing need for geriatric nursing and research. The study highlights the importance of government funding for Alzheimer's research and the availability of care options, such as adult daycare and hospice services. It also advocates for family and patient participation in clinical trials to advance understanding and treatment. Comprehensive efforts in awareness, research, and support systems are essential to address the growing burden of Alzheimer's disease and its profound impact on individuals and families.

Keywords: Alzheimer's Disease, Dementia, Seat of Mind, Exception, Old Timer's Disease

Introduction

The seat of the mind is no exception, the brain is considered the seat of mind and it is a remarkable organ that performs a role in intellectual, memory, emotions and decision making. However, age related conditions like Alzheimer's disease, Parkinson's disease and vascular dementia are not excluded from the effect of aging and age-related diseases (APA, 2023). To unravel the mystery, it is important to look at the normal brain structure and functions, the changes that occur in Alzheimer's and how the disease slowly destroys the brain system. According to Philip Scheltens et al., (2021) Alzheimer's disease (AD) is a complex, devastating and neurodegenerative condition that destroys the brain cells gradually, causing memory loss, thinking, language skills, and behavioural changes that primarily affects older individuals. The aging process affects the entire body, and the brain is no exception. Although, without disease, the brain can function effectively even up to a century of life. However, when this disease set in, it affects the brain system (Alzheimer's disease, 2021). There are different types of dementia which include Alzheimer disease, vascular dementia, Lewy bodies and frontotemporal dementia of which Alzheimer disease is the most prevalent which accounts for about 60% of all dementia (Perrotta, 2019).

The following are the risk factors that can predispose an individual to this condition; age the most prevalent, depression, diabetes mellitus, a history of head injuries, high cholesterol levels, certain lifestyle factors including physical inactivity, alcoholism, substance abuse and genetic factors (Bhushan, 2018). It contains two hypotheses which are cholinergic and amyloid hypotheses which alter the normal function of the brain and cause cell death (Breijyeh Rafik, 2020). The most common symptom of Alzheimer's disease is memory loss, changes in behavior, impaired judgment, disorientation, language and visuospatial disorders, difficulty in carrying out activities of daily living, withdrawing from social interactions, getting lost in a familiar environment, not recognizing family or friends, and difficulty in communication. In severe cases, people with Alzheimer disease become dependent on their caregivers, and often cannot get out of bed (Kumar et al., 2021). Quite often these symptoms are first noticed by friends or family. Physical assessment including medical history, disease history, cognitive tests, and medical imaging such as CT scan or MRI of the brain may be performed (Michael et al, 2019).

According to Santana, (2015) in 2013, globally, the prevalence of dementia was estimated to be about 44 million of the population also Yiannopoulou (2020), reported that in 2020, there are around 50 million AD patients globally which could be doubled every 5 years and it is projected to reach 152 million in about three decade. AD affects not only the affected individuals but also their family members, and the economy (Livingston, 2020). Currently, Alzheimer's disease has no cure, but there is conservative management available to improve the symptoms. This has financial implication on the healthcare systems worldwide despite having a great social impact. The management includes pharmacological and non-pharmacological treatment. There are two types of medication used acetylcholinesterase inhibitors and N-methyl D-aspartate antagonists. Cholinesterase inhibitors (CI) aim to increase acetylcholine availability in synaptic neurotransmission in order to treat memory disturbances. Currently, donepezil, rivastigmine and galantamine are the first-line treatment used to treat mild to moderate Alzheimer's disease while Memantine is used in

the treatment of moderate-to-severe Alzheimer's disease. It is a non-competitive NMDA receptor antagonist and effective in reduced glutamate-induced excitotoxicity. Improvement in cognition functioning and relief of behavioral symptoms impacts quality of life of patients, caregivers and reduce hospitalization (Cummings et al, 2020) Yiannopoulou (2020), reported that in 1906, Alzheimer's disease was named after a German psychiatrist, Dr. Alois Alzheimer's who discovered the disease condition. He describes a disease condition in a woman who becomes forgetful, has language and behavioral disorders. The result showed amyloid plaques and neurofibrillary tangles. As at the discovery time it was termed Presenile Dementia.

Scientists are actively researching Alzheimer's disease to better understand its causes and develop more effective treatments to unravel its mysteries and significant progress has been made in area such as biomarker, early detection techniques, and therapeutic strategies, immunotherapy to target beta-amyloid plaques, genetic interventions to modulate disease-related genes and to explore lifestyle factors that may have negative impacts on mental ability (Lakhan, 2023). Alzheimer's disease has a profound impact on individuals and the caregivers which can be emotionally and physically demanding. Despite the burden, there are resources and support system such as support groups and Alzheimer's association available for the affected individuals to enhance their coping system. Currently there is no cure for this condition, research is ongoing which is crucial for developing better treatments and ultimately find a cure (Schheltens et al, 2021).

The purpose of this review is to unravel the mystery by giving a brief description of the brain, AD, diagnosis, pathology, causes, and current treatments.

Anatomy and Physiology of the Brain

The brain is a highly intricate organ that governs the normal functions of the human body, including touch, motor skills, vision, thought, memory, emotion, breathing, temperature regulation, hunger, and other vital bodily systems. Together with the spinal cord, it forms the central nervous system (CNS). In an average adult, the brain weighs approximately 1.36 kg and comprises about 60% fat, while water, protein, carbohydrates, and salts constitute the remaining 40%. The brain is also rich in blood vessels and nerves, enabling its complex functions (John Hopkins Medicine, 2023).

The functional unit of the nervous system is the neuron, which is distributed between the central nervous system (CNS) and the peripheral nervous system (PNS). The CNS is further divided into gray matter and white matter. The brain and spinal cord, which constitute the CNS, display distinct distributions of these tissues. In the brain, gray matter forms the darker, outer portion, while white matter lies beneath as the lighter, inner section. Conversely, in the spinal cord, the white matter occupies the outer layer, and the gray matter is located within the inner layer. Gray matter is primarily composed of neuron somas, whereas white matter consists mainly of axons encased in a myelin sheath, which facilitates communication between neurons (John Hopkins Medicine, 2023).

The central nervous system comprises two fundamental types of cells: neurons and glial cells (NIH, 2023). Neurons are specialised cells that transmit impulses throughout the

body, enabling individuals to perform activities of daily living. Each neuron has three primary components: the cell body, the axon, and the dendrite. The cell body houses the nucleus, which regulates cellular activities and contains genetic material. The axon functions as a long tail, transmitting messages away from the cell, while the dendrites receive messages directed toward the cell. Communication between neurons occurs through the release of chemical substances called neurotransmitters, which traverse a small gap known as a synapse, connecting the axons and dendrites of adjacent neurons (NIH, 2023).

There are three main types of neurons, each with distinct functions. The first type is sensory neurons, which transmit messages from sense organs to the brain, enabling the perception of sensory stimuli. The second type is motor neurons, which regulate voluntary muscle activity by transmitting messages from nerve cells in the brain to the muscles, thus facilitating movement. The third type is interneurons, which serve as connectors, transmitting messages between neurons to ensure effective communication within the nervous system (NIH, 2023).

Structure and function of the brain

The brain is divided into three main parts: the cerebrum, cerebellum, and brainstem. The cerebrum, the largest part of the brain, is located at the front and is composed of gray matter. It plays a vital role in coordinating movement, regulating temperature, and facilitating functions such as problem-solving, speech, judgment, reasoning, emotions, learning, vision, hearing, and touch. The cerebral cortex makes up nearly half the brain's weight and is divided into two hemispheres, covered by sulci. The right hemisphere controls the left side of the body, while the left hemisphere controls the right side. These hemispheres communicate via the corpus callosum, which is centrally located within the cerebrum (John Hopkins Medicine, 2023).

The cerebellum is situated at the back of the head, beneath the temporal and occipital lobes and above the brainstem. It contains two hemispheres, with its outer portion housing neurons and the inner portion facilitating communication with the cerebral cortex. The cerebellum coordinates voluntary muscle movements and maintains posture, balance, and equilibrium. The brainstem, which connects the cerebrum to the spinal cord, consists of the midbrain, pons, and medulla. Messages travel between the brain and the rest of the body via the spinal cord, which extends from the medulla through the base of the skull and is protected by vertebrae.

Three protective layers called meninges surround the brain and spinal cord. The cerebrum is further divided into frontal, parietal, temporal, and occipital lobes, each with distinct functions. The frontal lobe, the largest, governs personality, decision-making, movement, and speech through Broca's area. The parietal lobe, located in the brain's middle region, aids in object identification, spatial relationships, and interpreting pain and touch. It contains Wernicke's area, essential for understanding language. The occipital lobe, found at the back of the brain, is primarily responsible for vision, while the temporal lobes, located laterally, are involved in short-term memory, speech, and smell recognition.

The brain also contains deeper structures. The pituitary gland, often called the "master gland," regulates hormone production in the body by coordinating with the thyroid, adrenals, ovaries, and testicles, receiving signals from the hypothalamus. The hypothalamus, located above the pituitary gland, controls body temperature, hunger, thirst, and sleep patterns. The amygdala, almond-shaped structures beneath each hemisphere, is critical in regulating emotions, stress, and the fight-or-flight response. The hippocampus, a seahorse-shaped structure in the temporal lobes, contributes to memory, learning, and spatial perception, playing a role in conditions such as Alzheimer's disease. The pineal gland, located deep within the brain, regulates circadian rhythms and the sleep-wake cycle through the secretion of melatonin (John Hopkins Medicine, 2023).

The brain receives blood and oxygen through the vertebral and carotid arteries. The external carotid arteries run along the neck, while the internal carotid arteries extend into the skull, supplying blood to the brain's front regions. The vertebral arteries converge at the brainstem to form the basilar artery, which supplies blood to the brain's rear portions. The circle of illis, a loop of interconnected arteries, facilitates blood flow between the brain's front and back, ensuring efficient communication within the arterial system.

Conceptualisation of Alzheimer's Disease

Alzheimer's disease (AD) represents a critical challenge in public health as the most prevalent form of dementia globally. This neurodegenerative condition is marked by two hallmark pathological features: beta-amyloid plaques that form outside neurons and neurofibrillary tangles caused by hyperphosphorylated tau protein inside neurons. These changes result in synapse loss and neuronal death, primarily in the medial temporal lobes and hippocampus, leading to cognitive decline and progressive memory impairment. Despite the strides in understanding its pathophysiology, AD remains a formidable disease with enormous implications for individuals, families, and healthcare systems worldwide.

Alzheimer's disease can manifest in three distinct forms: early-onset Alzheimer's, late-onset Alzheimer's, and Familial Alzheimer's Disease (FAD). Early-onset Alzheimer's accounts for approximately 10% of cases and is typically diagnosed before the age of 65. This form is particularly associated with genetic predispositions, and individuals with Down syndrome are notably at higher risk due to underlying chromosomal abnormalities. Muscle twitching and spasms are commonly observed clinical symptoms in this group. Late-onset Alzheimer's is the most prevalent form, constituting about 90% of cases and generally occurring after age 65. This form, often referred to as sporadic Alzheimer's, may or may not have hereditary connections. Familial Alzheimer's Disease (FAD), on the other hand, is rare, accounting for only 1% of cases. It is an autosomal dominant condition characterised by brain atrophy and neuronal cell death, making it particularly severe (Ravisankar et al., 2014).

The clinical presentation of Alzheimer's disease typically unfolds across five progressive stages: pre-clinical Alzheimer's disease, mild cognitive impairment (MCI), the initial phase, intermediate phase, and the final phase. The pre-clinical and MCI stages are the earliest manifestations, often marked by occasional forgetfulness, difficulty concentrating, misplacing commonly used objects, apathy, and mild attention deficits. Early symptoms

primarily include challenges in recalling recently learned information and acquiring new knowledge, reflecting early hippocampal and cortical involvement (Perrotta, 2019).

As the disease progresses into the initial phase, plaques and tangles in the brain cause significant cortical shrinkage, leading to noticeable memory loss and cognitive dysfunction. At this stage, individuals may struggle to recognise close relatives and experience difficulty in managing simple daily activities. The intermediate phase, also referred to as moderate Alzheimer's, is marked by further decline in cognitive and motor abilities. Activities of daily living become increasingly challenging, with individuals experiencing frequent falls due to impaired motor coordination. Long-term memory deteriorates, and neuropsychiatric changes, including aggression toward caregivers, emerge. Urinary incontinence often develops during this stage, reflecting the disease's pervasive impact on neurological and physical functions (Perrotta, 2019).

In the final phase of Alzheimer's disease, the severity of brain pathology becomes most evident. Plaques and tangles proliferate extensively throughout the brain, resulting in widespread cortical and ventricular shrinkage. Individuals in this stage are entirely dependent on caregivers for all activities of daily living. The profound cognitive and functional impairments render them incapable of communication or self-care, and mortality is frequently due to external factors such as infections or trauma. This severe stage underscores the devastating impact of Alzheimer's disease on both patients and their caregivers, who bear the burden of continuous care and emotional strain (Perrotta, 2019). Notwithstanding these significant impairments, certain skills tend to be preserved in individuals with Alzheimer's, even in advanced stages. These include abilities related to reading, storytelling, sharing memories, listening to music, singing, dancing, and drawing. Such retained skills offer a glimpse into the resilience of specific neural pathways and may provide therapeutic opportunities for improving quality of life. Activities like listening to familiar music or engaging in creative expression can evoke emotional responses and foster meaningful interactions with patients, serving as a source of comfort and connection for both patients and caregivers (Waldemar et al., 2007).

The economic and social costs of Alzheimer's disease are staggering. In 2017, care expenses for AD reached an estimated $259 billion, with projections indicating an increase to $1.1 trillion by 2050. The financial burden reflects the high demand for specialised care, long-term support, and healthcare services required by individuals living with the disease. Moreover, Alzheimer's disease has a profound emotional toll on families and caregivers, who often face significant challenges in managing the behavioural and physical aspects of the disease. Early recognition and intervention are crucial in mitigating these burdens, but current diagnostic methods remain limited. While brain changes associated with AD can begin as early as two decades before symptoms emerge, definitive diagnosis still relies on clinical observation and post-mortem confirmation. The 2018 NIA-AA guidelines introduced the A/T/N classification system, which utilises biomarkers for amyloid, tau, and neurodegeneration to aid in research-based diagnosis. Other diagnostic approaches include cognitive assessments, neuroimaging techniques such as MRI, CT, and PET scans, and medical history evaluations. However, in developing countries, these methods are often inaccessible due to inadequate healthcare infrastructure and a shortage of trained

specialists, complicating efforts to provide timely and accurate diagnoses (Ravisankar et al., 2016; Pais, 2020).

The epidemiological landscape of Alzheimer's disease varies across regions, with late-onset Alzheimer's predominantly affecting individuals aged 65 and older. Early-onset cases, though less common, may occur as early as the 50s. Alzheimer's is most prevalent in Western Europe and North America, but Latin America reports a higher incidence rate, likely due to a combination of genetic, environmental, and socio-economic factors. In Africa, approximately 2.4% of adults over 50 are affected by dementia, with 57.1% of these cases attributed to Alzheimer's. Sub-Saharan Africa is projected to experience a significant rise in prevalence by 2030 and 2050, driven by increased life expectancy and improved recognition of the disease. In Nigeria, the incidence of Alzheimer's is relatively lower among the Yoruba population compared to other regions, but the prevalence has been steadily increasing over the past two decades. Epidemiological data consistently show that women are disproportionately affected by Alzheimer's disease, with a significantly higher prevalence compared to men. This gender disparity may be linked to longer life expectancy in women and potential hormonal factors that influence the disease's progression (Alzheimer's Society, 2023; Yiannopoulou, 2020; Adeloye et al., 2019; Hendrie et al., 2001).

In summary, Alzheimer's disease is a complex, multifaceted condition with profound implications for individuals, families, and society. Its pathophysiological underpinnings, clinical features, and progressive stages underscore the challenges associated with diagnosis, management, and caregiving. The preserved skills in affected individuals highlight the importance of exploring therapeutic avenues that focus on enhancing quality of life and emotional well-being. As the prevalence of Alzheimer's continues to rise globally, there is an urgent need for improved diagnostic methods, more effective treatments, and robust support systems for patients and caregivers alike. While current therapies, such as cholinesterase inhibitors and memantine, offer symptomatic relief, they do not alter the disease's trajectory, emphasising the critical need for continued research and innovation in Alzheimer's care and management.

While reaching retirement age does not guarantee the development of dementia, specific lifestyle factors significantly increase the risk. Nine key risk factors—poor education, high blood pressure, head trauma, obesity, hearing loss, depression, diabetes, smoking, social isolation, and low physical activity—contribute to approximately 35% of dementia cases (De la Rosa, 2022). The likelihood of developing Alzheimer's increases with age, rising from about 3% at 65 to over 30% by 85. Alzheimer's is categorized as early-onset (EOAD) or late-onset (LOAD), with the latter accounting for over 95% of cases and typically appearing after age 65 (Sheppard, 2020). Lifestyle factors such as smoking, obesity, diabetes, and high blood pressure exacerbate cerebrovascular conditions linked to AD (Lee, 2022). Environmental exposures, including heavy metals, pollution, and stress, further heighten risk through mechanisms like oxidative stress and inflammation (Omura, 2019). Genetic predispositions also play a role, particularly in familial cases where inheritance of a single gene significantly increases susceptibility (NHS, 2021). Common myths about Alzheimer's, such as attributing it solely to aging or claiming it is curable, persist despite scientific evidence to the contrary (Alzheimer's Association, 2023; Kantor, 2023).

Pathophysiology of Alzheimer Disease

There are several neurons in the brain of a healthy person each with long, branching extensions that allow connection with other neuron through synapses that permits impulses to travel rapidly through the brain, These impulses create the cellular basis of memories, sensations, thoughts, emotions, movements and skills. (Patwal, 2023). Alzheimer Disease is caused by the building up of amyloid proteins in the brain, extracellular beta-amyloid deposits plaques and intracellular neurofibrillary tangles protein are the two pathologic hallmarks of Alzheimer disease which are responsible to maintain the structure of a neuron, including microtubules that deliver nutrients throughout the neuron (González, 2022).

Loss of synapses and neurons occurs due to the accumulated plaques and tangles, which results in gross shrinkage of the mesial temporal lobe and hyppocampus . The amyloid hypothesis posits that progressive accumulation of beta-amyloid in the brain to activate immune system cells in the brain called microglia. Microglia tries to clear the toxic proteins and widespread debris from dead cells resulting to chronic inflammation. There is decline in the ability of the brain to metabolize glucose that fuel the brain resulting to neuronal cell death, loss of neuronal synapses, and progressive neurotransmitter that in turn leads to decrease the functionality of the brain.

The brain can no longer compensate for the damaged neurons, and the individual shows slight reduction in cognitive function. As the disease progresses, there will be neurons cells death manifesting the following symptoms; memory loss or disorientation to time or place and altered in carrying out activities of daily living (Montine, 2019; Kinney, 2018).

Diagnosis of Alzheimer Disease

Alzheimer's disease currently has no cure, but prescribed drugs can alleviate symptoms and improve the quality of life for patients and their families. Early detection is crucial as it facilitates better management, allowing some individuals to retain their mental abilities for a limited period. Although these medications help in symptom management, they do not alter the progression of the disease (Thakur, 2018). Diagnosing Alzheimer's disease or dementia involves the use of multiple tools, as no single test is definitive. Medical history, neurological examinations, cognitive assessments, and imaging techniques such as MRI, CT, and PET scans are typically employed alongside fluid or blood tests to ensure diagnostic accuracy (National Institute of Aging, 2022).

During diagnosis, a thorough review of the patient's medical, psychiatric, cognitive, behavioural, and family history is conducted. This step is crucial in understanding any pre-existing or hereditary conditions that could be linked to Alzheimer's or other forms of dementia (National Institute of Aging, 2022). Physical examinations and diagnostic tests are also essential components of the diagnostic process. These assessments include a head-to-toe physical evaluation, vital sign monitoring, and auscultation of the heart and lungs. Samples of blood and urine are collected and analysed to identify health conditions that may mimic or exacerbate Alzheimer's symptoms, such as depression, untreated sleep

apnea, delirium, medication side effects, thyroid disorders, vitamin deficiencies, and excessive alcohol consumption (National Institute of Aging, 2022).

A neurological examination is conducted to assess for brain disorders beyond Alzheimer's, such as strokes, Parkinson's disease, or brain tumours, which could impact memory and cognitive abilities. This examination evaluates reflexes, coordination, muscle tone, strength, eye movement, speech, and sensation. Advanced imaging techniques like MRI, CT, and PET scans are employed to estimate beta-amyloid levels in the brain. These imaging modalities are considered effective in diagnosing Alzheimer's disease, particularly in its early stages (National Institute of Aging, 2022; Xiaoxi Pan, 2020). Functional, cognitive, and behavioural tests are administered to evaluate changes in memory, thinking, and problem-solving abilities. Neuropsychologists conduct these tests to assess judgment, attention, language, and the impact of cognitive symptoms on daily activities. These assessments also measure the patient's self-awareness and ability to recall information, follow instructions, and perform simple calculations. Common examples of such tests include the Ascertain Dementia 8 (AD8) and the Functional Activities Questionnaire (FAQ) (Alzheimer's Society, 2023).

Cerebrospinal fluid (CSF) tests are another diagnostic tool, with research showing that early-stage Alzheimer's disease may alter CSF levels of markers like tau, beta-amyloid, and neurofilament light (NfL). These markers are linked to neurodegenerative diseases and are associated with abnormal deposits in the brain (Alzheimer's Society, 2023). Blood tests are also being explored as a less invasive diagnostic method. Researchers are investigating whether specific blood markers, such as tau and beta-amyloid, exhibit consistent changes tied to Alzheimer's disease and can be detected before and after the onset of symptoms (Porsteinsson, 2021).

The histopathology of Alzheimer's disease reveals progressive brain atrophy, beginning in the hippocampus and medial temporal lobe. This progression is characterised by the accumulation of amyloid plaques and tau tangles, which are hallmark features of the disease. Key histological findings include extracellular amyloid plaques composed of Aβ peptides and intraneuronal neurofibrillary tangles. These features can be identified using silver staining techniques such as Bielschowsky or Gallyas staining. Neuritic plaques are often associated with damaged neuronal processes (Montine, 2019).

The diagnosis of Alzheimer's disease often relies on the presence of neuritic plaques, although their burden does not consistently correlate with cognitive status. In contrast, the distribution of neurofibrillary tangles is more closely linked to cognitive function. The Braak staging system classifies neurofibrillary tangle distribution into six stages (I-VI), with each stage reflecting the progression of tangles to additional brain regions. In the earliest stages (I and II), tangles are observed in the transentorhinal cortex. As the disease advances, tangles spread to the hippocampus and association cortex in stages III and IV. By stages V and VI, tangles are present in the primary motor or sensory cortex and granule neurons of the dentate fascia (Montine, 2019).

Non-Management of Alzheimer Disease

Non-management of Alzheimer's disease often revolves around early detection and understanding of its progression rather than definitive treatments, as the condition remains incurable. The Clock-Drawing Test (CDT) is a simple and effective tool for identifying cognitive impairment and potential early signs of Alzheimer's disease, which can be administered even by non-professionals. The test requires the patient to draw a clock indicating a specific time, such as "10 minutes past 11." Any errors, like misplaced numbers or hands, signal a need for further evaluation. Its ability to detect thinking issues quickly makes the CDT valuable for identifying and monitoring brain dysfunctions over time (Rosenzweig, 2022). Despite progress in understanding Alzheimer's, no single intervention effectively manages the disease for all patients. Treatments are mainly symptomatic, focusing on pharmacologic and non-pharmacologic approaches. Medications aim to increase neurotransmitter levels and improve symptoms, while non-drug strategies address cognitive function and behavioural challenges such as depression, wandering, agitation, and aggression. These approaches also seek to enhance the quality of life for patients and caregivers, though none provide a definitive cure (NIA, 2023).

Radiation therapy, although rarely used for Alzheimer's, offers an intriguing potential avenue for managing the disease. Research suggests that low-dose radiation may reduce β-amyloid deposits, inflammation, and improve vascular function while minimizing cognitive side effects when critical brain areas are protected. For instance, prophylactic cranial irradiation at 25 Gy, a standard practice for some cancer patients, has not shown cognitive decline. This demonstrates the feasibility of exploring radiation therapy as a cost-effective alternative to emerging pharmaceuticals in Alzheimer's management, despite its current limited application (Michael, 2019).

Nurses play a critical role in observing and supporting patients with Alzheimer's, particularly in hospital settings. Their primary objectives are to ensure safety, promote independence, reduce anxiety, and enhance communication and social interactions. Creating a predictable and calming environment can significantly support patients' cognitive function. Simple measures like using clocks and calendars, colour-coded doorways, and memory aids can reduce confusion and enhance a sense of security. Encouraging active participation in daily tasks helps maintain cognitive and social skills, albeit to a limited extent (Brunner et al., 2021). Promoting independence in self-care activities is essential for enhancing patients' well-being. Daily tasks are simplified into manageable steps to foster a sense of accomplishment and maintain autonomy for as long as possible. Similarly, ensuring physical safety is a key priority. Handrails, proper lighting, and eliminating hazards can reduce the risk of falls and accidents. While restrictions like banning driving are necessary for safety, efforts to minimise anxiety through supportive measures are equally important.

Communication remains a challenge for Alzheimer's patients, as they often struggle to remember word meanings. Using clear, simple sentences and incorporating tactile gestures, such as hugs or pats, can improve understanding and provide emotional reassurance. Additionally, socialisation is crucial for maintaining dignity and quality of life.

Engaging patients in hobbies, visits with friends, or even calls and letters helps sustain their emotional well-being (Brunner et al., 2021). Adequate nutrition and balanced activity are vital aspects of care. Patients often prefer familiar foods, and meals should be served warm and appealing to encourage eating. As the disease progresses, caregivers may need to assist with feeding. Regular physical exercise, coupled with strategies like warm milk or a back rub, can aid relaxation and promote better sleep patterns.

Community and home-based care play a significant role in supporting Alzheimer's patients and their caregivers. Resources such as family support groups and respite care services offer invaluable assistance. These services provide structured breaks for caregivers, allowing trained professionals or volunteers to take over caregiving responsibilities temporarily. This ensures the caregiver's well-being while maintaining the patient's care (Brunner et al., 2021). Ultimately, non-management of Alzheimer's revolves around early detection, symptomatic support, and creating an environment conducive to improving patients' and caregivers' quality of life.

Medical management of Alzheimer Disease

Managing Alzheimer's disease focuses on improving the quality of life for individuals and supporting their caregivers. In the early stages of the disease, cholinesterase inhibitors such as galantamine, rivastigmine, and donepezil are commonly prescribed to manage mild to moderate symptoms. These medications work by preventing the breakdown of acetylcholine, a neurotransmitter critical for memory and learning. By enhancing cognitive function, these drugs can improve social engagement and quality of life. However, their efficacy often diminishes as the disease advances, with individual responses to treatment varying significantly. Physicians typically conduct diagnostic procedures, such as PET scans or cerebrospinal fluid analysis, to confirm amyloid deposits before prescribing these medications. Regular monitoring, including MRIs, is also necessary to detect side effects like amyloid-related imaging abnormalities (ARIA) (NIA, 2023).

For moderate to severe Alzheimer's, memantine, an NMDA receptor antagonist, is frequently recommended. This medication helps regulate glutamate activity, which can otherwise become toxic to nerve cells, thereby alleviating symptoms. Memantine enables patients to maintain some essential daily activities, such as independently using the bathroom, for a longer time. This preservation of function significantly benefits caregivers by reducing the intensity of care required (NIA, 2023). Another option is lecanemab, administered via intravenous infusion every four weeks to reduce beta-amyloid plaques, a hallmark of Alzheimer's disease (NIA, 2023). Despite their benefits, medications for Alzheimer's can have side effects, including nausea, vomiting, diarrhea, headaches, and dizziness, which require careful management (Lakhan, 2023). Lifestyle modifications during the presymptomatic and predementia stages of Alzheimer's have been shown to reduce the risk or delay disease progression. Physical inactivity, for instance, is associated with approximately five million deaths annually from non-communicable diseases, including dementia. Aerobic exercise, which improves cardiovascular health and cognitive function, has emerged as a powerful intervention for mitigating Alzheimer's risk. Activities such as brisk walking, swimming, or cycling enhance brain plasticity, improving learning

and memory capacities. Strength-building exercises targeting major muscle groups also contribute to brain health by regulating blood sugar levels and reducing the risk of diabetes. It is recommended that individuals engage in aerobic and strength-building activities regularly to maximise these benefits (Alzheimer's Society, 2023; Yu et al., 2020; Bhatti et al., 2019).

Adequate nutrition is another critical factor in Alzheimer's prevention and management. Diets such as the Mediterranean diet, rich in whole grains, fruits, vegetables, nuts, and oily fish, have demonstrated protective effects against dementia. Reducing red and processed meats while favouring healthy fats, such as those found in olive or rapeseed oil, further supports brain health. Limiting sugar, salt, and alcohol consumption also contributes to overall well-being and reduces the risk of conditions linked to Alzheimer's, such as cardiovascular disease and diabetes (Delacey, 2023). Mental and social activities are equally vital in strengthening the brain's resilience against Alzheimer's disease. Cognitive engagement through activities such as puzzles, crosswords, or learning new skills enhances thinking and memory. Social interactions, whether through conversations, volunteering, or group activities, improve mental health by reducing stress and enhancing mood. Even technology, such as smartphone apps offering memory games, can provide stimulating and beneficial mental exercises. Regular engagement in these activities not only improves cognitive function but also creates opportunities for emotional connection, further bolstering mental well-being (Crous-Bou, 2017).

Routine medical check-ups play a preventive role in Alzheimer's disease by managing risk factors such as high blood pressure, diabetes, and hearing loss. Specialists in otolaryngology and ophthalmology can help prevent or correct sensory impairments, which are linked to cognitive decline. Additionally, ensuring adequate rest and sleep, reducing alcohol intake, and quitting smoking are crucial steps in reducing Alzheimer's risk (Delacey, 2023; Alzheimer's Society, 2023). For individuals with advanced Alzheimer's disease, palliative care focuses on alleviating symptoms and improving comfort. This approach can be implemented at any stage of the disease to manage distressing symptoms and enhance the overall quality of life. Daily assistance for patients, such as maintaining routines, offering reminders, and creating a safe environment, also contributes to their comfort and dignity. Caregivers should use gentle communication, respect personal preferences, and foster independence as much as possible, which helps preserve the individual's sense of control and self-esteem (Kathleen, 2021; Rosin, 2020).

Family caregivers, who often bear the emotional and physical burdens of Alzheimer's care, require support to maintain their well-being. Strategies such as joining caregiver support groups, practicing self-care, and engaging in regular exercise can help reduce stress and promote resilience. Early planning for healthcare directives, legal arrangements, and long-term care options ensures that both the patient and caregiver are prepared for future challenges. Advanced discussions involving the patient in decision-making foster collaboration and respect for their wishes, easing transitions during later stages of the disease (Rosin, 2020). The management of Alzheimer's disease demands a multifaceted approach that includes medical treatment, lifestyle changes, and robust support systems for both patients and caregivers.

Nursing Implication

The nursing implications for managing Alzheimer's disease focus on early identification, patient care, and collaboration among healthcare professionals. Since Alzheimer's disease cannot be cured, early detection of signs and symptoms is vital for improving the patient's quality of life and managing symptoms effectively. Nurses play a pivotal role in this process by working closely with clinicians and family members to ensure optimal patient outcomes. The use of evidence-based practice bundles is essential in delivering high-quality care to patients with Alzheimer's disease, ensuring interventions are both effective and grounded in research. Effective communication is a cornerstone of nursing care for Alzheimer's patients. Building rapport through shared interests and establishing trust before addressing clinical matters are critical. Nurses must be attentive to the fears and anxieties of patients, as these emotions can impede their ability to retain important information and adhere to care instructions. By acknowledging and addressing these fears, nurses can create a supportive environment that enhances the patient's overall experience and fosters better compliance with care plans.

Nurse administrators have a crucial role in ensuring an adequate number of nurses are available to maintain high standards of care, especially given the growing aging population and increased demand for geriatric nursing services. Nursing leaders are responsible for orienting and educating nurses and student nurses at various levels, ensuring they are well-prepared to assess and manage care effectively. Clear communication about potential care outcomes with patients and families is also important, as it enables them to better evaluate the quality of nursing care provided.

Additionally, nurse administrators are instrumental in developing policies and procedures specific to Alzheimer's care. Their leadership ensures collaboration among healthcare professionals to provide appropriate treatments and psychological support for patients. Nursing research also plays a significant role in identifying risk factors, refining communication strategies, and improving symptom management techniques. Collaboration with global nursing leaders and stakeholders is vital for advancing evidence-based practices, exploring disease-modifying treatments, and promoting preventive strategies to enhance the quality of care for individuals with Alzheimer's disease and other mental health conditions.

Ongoing research, including clinical trials, is essential to uncovering preventive measures and new treatment options for Alzheimer's disease. Nurses can contribute to these efforts by encouraging volunteers to participate in trials and by actively engaging in studies themselves. Providing incentives such as workshops and training programs in clinical teaching can motivate both student and staff nurses, further enriching their knowledge and skill sets. Additionally, regular awareness programs aimed at educating the public about Alzheimer's disease and overall mental health can help reduce stigma, promote early detection, and enhance community support. Nurses' collective efforts in these areas are indispensable in addressing the challenges posed by Alzheimer's disease and improving patient care outcomes.

Conclusion

The brain, as the seat of the mind, is significantly impacted by aging and diseases like Alzheimer's. This devastating disease leads to mental distress and high healthcare costs, making early diagnosis crucial for slowing its progression and enhancing quality of life. Capacity building for health professionals, including training in interpersonal and communication skills is essential for improving patient care. For individuals with Alzheimer's, addressing cognitive loss and behavioral issues like aggression and agitation is a priority. Ongoing research, including clinical trials, is needed to identify preventive factors and develop effective treatments. Additionally, maintaining mental, physical, and social activity, along with a heart-healthy and brain-healthy diet, is vital for prevention. Collectively, these efforts can lead to better care and outcomes for those affected by Alzheimer's. Independent neighborhoods for Alzheimer's patients, such as nursing homes and adult day care, offer specialized programs to meet their needs. Ongoing research is revealing breakthroughs and innovative treatments.

Recommendations

The need for increased government funding for Alzheimer's research cannot be overstated, as the financial burden of care far exceeds that of many other diseases. Addressing this challenge requires not only financial investment but also a concerted effort to strengthen the healthcare workforce. Employing more geriatric nurses and empowering them to lead research initiatives on Alzheimer's will foster innovative solutions while ensuring that patient rights are prioritised and upheld.

For patients nearing the end of life, discussions on advanced care planning and palliative care are crucial to ensure dignity and comfort. Treatment plans should be tailored to address the unique needs and preferences of each individual. This approach demands effective communication strategies that facilitate understanding and collaboration among patients, families, and healthcare providers.

To further support patients and their families, a range of care options, such as adult day care, respite services, and hospice care, should be accessible. These services provide much-needed relief and support for both patients and caregivers. Additionally, encouraging participation in clinical trials offers hope for future advancements in treatment, benefiting not only current patients but also future generations affected by Alzheimer's disease. Comprehensive strategies are essential to improve outcomes and alleviate the profound impacts of this condition.

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