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REVIEW ARTICLE

Dementia in Older Adults: Advances in Care and Prevention

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Abstract: Dementia is a progressive condition affecting millions globally, posing a significant public health challenge as populations age. Currently, over 55 million people live with dementia, including subtypes such as Alzheimer's disease, Lewy body dementia, vascular dementia, frontotemporal dementia, and HIV-associated dementia. This review explores advancements in diagnosing, managing, and preventing dementia. Diagnostic accuracy has been enhanced with tools like the Mini-Mental State Examination (MMSE), Montreal Cognitive Assessment (MoCA), cerebrospinal fluid biomarkers, and PET imaging. Emerging technologies, including artificial intelligence and digital tools, promise earlier detection.

Management strategies integrate non-pharmacologic approaches—cognitive training, lifestyle modifications, and social engagement—with pharmacologic treatments such as cholinesterase inhibitors and memantine. Prevention efforts emphasize addressing modifiable risk factors, such as hypertension and obesity, and fostering cognitive reserve through education and physical activity. Despite these advancements, challenges persist, including ethical concerns surrounding early diagnosis, disparities in access to care, and ongoing debates regarding the efficacy of novel therapies.

A holistic, interdisciplinary approach is essential for effective dementia care. This review calls for collaborative action among healthcare professionals, policymakers, and researchers, emphasizing the urgent need to improve equitable access to care, promote early and accurate diagnosis, and invest in targeted prevention strategies to mitigate the growing global impact of dementia.

Keywords: Dementia; Cognitive Impairment, Alzheimer's, Prevention, Aging, Brain Health.

1. INTRODUCTION

The National Institute of Health defines dementia as the loss of cognitive functioning—thinking, remembering, and reasoning—to an extent that interferes with a person's daily life and activities [8]. In the United States, the population aged 65 and older is projected to double from approximately 35 million to over 70 million by 2030, significantly increasing the number of individuals at risk [10]. As dementia progresses, it impairs memory, behavior, reasoning, and the ability to perform routine tasks, posing a growing public health concern.

Globally, more than 55 million people are currently living with dementia, with over 60% residing in low- and middle-income countries. Nearly 10 million new cases are reported each year [6]. In 2022, the Centers for Disease Control and Prevention (CDC) reported that 4.0% of U.S. adults aged 65 and older had been diagnosed with dementia. Prevalence increases with age, from 1.7% among those aged 65–74 to 13.1% in those 85 and older. Educational attainment appears protective, with diagnosis rates declining from 7.9% among individuals with less than a high school diploma to 2.2% among college graduates [7].

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Dementia encompasses a range of subtypes, with Alzheimer's disease being the most common. Other forms include frontotemporal dementia, vascular dementia, Lewy body dementia, Creutzfeldt-Jakob disease, and HIV-associated dementia. Additionally, dementia may be associated with other conditions, such as Huntington's disease, niacin deficiency, metachromatic leukodystrophy, and measles [8]. Although the pathophysiology differs among subtypes, most involve neurodegenerative processes, vascular injury, or both. Advancing research remains critical to improving diagnostic accuracy, refining treatment strategies, and supporting patients and caregivers [1].

This review provides a comprehensive analysis of current advances in the care and prevention of dementia in older adults. It examines recent trends in diagnosis, innovative therapeutic approaches, and strategies for prevention. The article also aims to identify gaps in the literature and care delivery to inform future research and promote better outcomes across healthcare systems.

2. METHODOLOGY

This narrative review was conducted to synthesize current literature on diagnosing, managing, and preventing dementia in older adults. A comprehensive search was performed using the following databases: PubMed, Google Scholar, Scopus, and the World Health Organization (WHO) database. The search included peer-reviewed articles published between 2007 and 2024.

Keywords used in the search included "Dementia," "Alzheimer's disease," "Vascular dementia," "Lewy body dementia," "Frontotemporal dementia," "HIV-associated dementia," "Dementia prevention," "Cognitive decline," "Diagnostic biomarkers," and "Dementia management."

Inclusion criteria consisted of English-language articles that focused on older adult populations (aged 65 and above) and addressed recent advances in diagnostic tools, pharmacologic and non-pharmacologic interventions, prevention strategies, or public health implications. Studies not involving human subjects, articles unrelated to dementia, or those lacking clear relevance to older adult care were excluded. Additional sources, such as official guidelines and epidemiological reports from the Centers for Disease Control and Prevention (CDC) and the National Institute on Aging (NIA), were included to provide context and current data.

This methodology aimed to ensure the inclusion of high-quality, relevant studies that reflect contemporary understanding and practices in dementia care and prevention.

3. PATHOPHYSIOLOGY OF COGNITIVE DECLINE AND DEMENTIA

The progressive degeneration of neurons characterizes dementia, ultimately resulting in irreversible brain damage and the loss of cognitive and functional abilities. Dementia led to many complications; new dementia diagnoses were common after falls, with 10.6% of older adults being diagnosed with dementia in the first year after a fall. The frequency of incident dementia diagnoses after a fall highlights the need for cognitive screening for older adults who require an emergency department visit or hospital admission for an injurious fall [11]. A recent systematic review and Bayesian network meta-analysis aimed to determine and compare the contributions of modifiable risk factors with the prevention of dementia in older adults with analyses of data from forty-three cohort studies defined factors associated with lower risks of all-cause dementia. These factors included no sleep disturbances, a high level of education, no history of diabetes, non-obese patients, no smoking history, living with family members, participation in physical exercise, abstinence from drinking, and no history of hypertension [].

In Alzheimer's disease, the most common subtype is extracellular beta-amyloid plaques and intracellular neurofibrillary tangles composed of hyperphosphorylated tau, which disrupt neuronal communication and structural integrity. This leads to widespread neuronal loss, particularly in the hippocampus and cortex, and decreases acetylcholine levels [3].

Degeneration of cholinergic circuits contributes to diffuse cortical and subcortical atrophy, particularly within the hippocampus, a hallmark of recent memory impairment [8]. Onset typically begins after age 65, with advancing age considered the most significant risk factor, accounting for approximately 66% of di-

agnoses [12]. Older adults with undiagnosed cognitive impairment consistent with dementia had no reported dementia-related diagnosis from a healthcare provider. However, they had a cognitive impairment consistent with dementia, whereas persons with diagnosed cognitive impairment consistent with dementia reported a dementia-related diagnosis from a healthcare provider [9].

Alzheimer's disease may present in sporadic or familial forms. Familial Alzheimer's disease (FAD), a rare and early-onset variant, is associated with autosomal dominant mutations in genes such as amyloid precursor protein (APP), presenilin 1 (PSEN1), and presenilin 2 (PSEN2). In Alzheimer's disease, the neurons damaged first are those in parts of the brain responsible for memory, language, and thinking, which is why the first symptoms tend to be memory, language, and thinking problems [2]. These mutations promote the overproduction and aggregation of amyloid-beta (Aβ), leading to disease onset as early as 30 to 50 years of age [8]. The apolipoprotein E (APOE) ε4 allele is a well-established genetic risk factor for sporadic late-onset Alzheimer's disease, although it is neither necessary nor sufficient for disease development.

Lewy body dementia, the second most common form of neurodegenerative dementia in older adults, involves the accumulation of alpha-synuclein proteins (Lewy bodies) in neurons, impairing synaptic function and neuronal viability [1]. Clinically, it is distinguished by more rapid progression than Alzheimer's disease and features such as visual hallucinations, fluctuating cognition, REM sleep behavior disorder, and parkinsonian motor symptoms [3].

Vascular dementia results from cerebrovascular pathology, including chronic ischemia, multiple infarcts, or white matter lesions due to reduced cerebral blood flow [8]. Stroke is a major contributing factor. Clinical manifestations include cognitive deficits, gait disturbance, and urinary symptoms. Common neuropathological findings include large vessel thromboembolic disease and small vessel disease associated with lacunar infarcts, cortical microinfarcts, and microhemorrhages [3].

Frontotemporal dementia (FTD), also known as Pick's disease, is characterized by selective degeneration of the frontal and temporal lobes. It often presents with early personality, behavior, and language changes, including primary progressive aphasia. Pathological features include abnormal accumulations of proteins such as microtubule-associated protein tau (MAPT) and TAR DNA-binding protein 43 (TDP-43) [3].

Creutzfeldt-Jakob disease is a rare, rapidly progressive prion disease, often transmitted via contaminated medical instruments, such as corneal grafts or neurosurgical tools. It typically presents with cognitive decline, myoclonus, and ataxia, progressing to death within months [8].

HIV-associated dementia is a late manifestation of advanced HIV infection and is now relatively rare due to the widespread use of antiretroviral therapy. When present, it features subcortical cognitive slowing, gait disturbance, irritability, mood changes, and motor dysfunction. Generalized hyperreflexia and impaired limb coordination are also common in advanced stages [5].

Several modifiable risk factors are associated with cognitive decline and dementia. These include low educational attainment, hearing loss, traumatic brain injury, hypertension, social isolation, physical inactivity, excessive alcohol intake (>21 units/week), depression, air pollution, smoking, and obesity [12]. Biological mechanisms such as neuroinflammation, oxidative stress, insulin resistance (as in diabetes), and mitochondrial dysfunction contribute to neuronal damage across all dementia subtypes. Understanding these mechanisms is essential for developing targeted diagnostic and therapeutic interventions.

4. ADVANCES IN DIAGNOSIS

Advancements in the diagnosis of dementia have substantially improved the ability to differentiate among subtypes and monitor disease progression. Clinical presentation remains foundational, with specific diagnostic criteria tailored to each subtype. Alzheimer's disease typically presents with insidious memory loss and gradual cognitive decline, whereas vascular dementia often follows a history of cerebrovascular events [15]. Frontotemporal dementia manifests early with behavioral or language changes, while Lewy body dementia is characterized by fluctuating cognition, visual hallucinations, and parkinsonism

[12]. These clinical features and comprehensive history-taking and neurological examination remain essential for diagnostic accuracy.

Cognitive screening tools such as the Mini-Mental State Examination (MMSE) and the Montreal Cognitive Assessment (MoCA) are widely employed in clinical practice. The MMSE evaluates orientation, attention, memory, and language skills, offering a broad overview of cognitive status. The MoCA, meanwhile, is more sensitive to early cognitive changes, particularly in executive and visuospatial domains [15]. Both tools provide valuable initial insights and guide further diagnostic evaluation.

In recent years, biomarker research and imaging techniques have significantly enhanced diagnostic precision. Cerebrospinal fluid (CSF) analysis for amyloid-beta and tau proteins aids in identifying Alzheimer ’s-related pathology [15]. Neuroimaging modalities such as amyloid PET scans, magnetic resonance imaging (MRI), and computed tomography (CT) enable in vivo visualization of structural and functional brain changes [14].

Emerging digital technologies are now augmenting traditional methods. Artificial intelligence (AI)-driven platforms, such as Cognetivity’s Integrated Cognitive Assessment (ICA) and Linus Health’s digital tools, utilize pattern recognition and machine learning to detect early cognitive changes through smartphone or tablet-based testing. Additionally, wearable devices—such as smartwatches and biosensor-enabled rings—can monitor activity levels, sleep quality, speech patterns, and gait disturbances in real time. These tools offer continuous, non-invasive monitoring and the potential for earlier detection of cognitive decline, even before clinical symptoms become apparent. Such technologies can support earlier interventions and personalized care planning when integrated with traditional assessments.

5. MANAGEMENT STRATEGIES FOR DEMENTIA AND ITS SUBTYPES

Effective management of dementia requires a comprehensive approach that combines non-pharmacologic and pharmacologic strategies tailored to the individual’s specific needs and the subtype of dementia. Accurate prevalence estimates across the continuum of Alzheimer’s disease are essential, particularly as newly approved anti-amyloid therapies are intended for use in the early stages of the disease [14].

Non-pharmacologic interventions are foundational in preserving cognitive function and improving quality of life. Cognitive training and rehabilitation are designed to enhance memory, attention, and problem-solving abilities through structured, individualized activities [12]. Lifestyle modifications, such as adherence to a Mediterranean diet rich in fruits, vegetables, legumes, and healthy fats, have reduced cognitive decline and improved vascular health [12]. Regular physical activity, good sleep hygiene, and stress management are essential for maintaining brain function and reducing modifiable risk factors. Additionally, social engagement and supportive environments help alleviate isolation and depression—common challenges in older adults with dementia—promoting cognitive resilience and emotional well-being [12].

Pharmacologic therapies currently in clinical use aim to manage symptoms rather than alter disease progression. Cholinesterase inhibitors, including donepezil, rivastigmine, and galantamine, are approved for the treatment of mild to moderate Alzheimer’s disease and Lewy body dementia. These agents enhance cholinergic neurotransmission but provide only modest, temporary improvements in cognition and daily functioning. Similarly, memantine, an NMDA receptor antagonist, is approved for moderate to severe Alzheimer’s disease and may help with behavioral symptoms and cognition by regulating glutamatergic activity [8]. However, neither class of medication is considered disease-modifying, and their long-term effectiveness remains limited.

In contrast, emerging anti-amyloid therapies such as aducanumab and lecanemab represent a new class of treatments that aim to slow disease progression by reducing amyloid-beta accumulation in the brain. These monoclonal antibodies have demonstrated amyloid clearance in imaging studies, and lecanemab has shown modest cognitive benefit in early-stage Alzheimer’s disease in clinical trials. Despite their promise, these therapies are associated with substantial costs, require intravenous administration, and carry poten-

tial risks such as amyloid-related imaging abnormalities (ARIA), necessitating careful patient selection and monitoring [1].

For other dementia subtypes, pharmacologic management varies. Vascular dementia is addressed primarily through aggressive control of vascular risk factors, including hypertension, hyperlipidemia, and diabetes. In HIV-associated dementia, antiretroviral therapy remains the cornerstone of treatment, often stabilizing or reversing cognitive impairment when initiated early [8].

Interdisciplinary care models are essential in managing the multifaceted needs of individuals with dementia. Collaboration among geriatricians, neurologists, psychiatrists, primary care providers, and allied health professionals allows for comprehensive care planning. Family caregivers play a critical role in daily support, and treatment strategies must consider their well-being. Community-based interventions, such as dementia-friendly environments, caregiver education programs, and local support groups, extend care beyond the clinical setting, reduce caregiver burden, and enhance patient outcomes [12].

By integrating medical, behavioral, and social support strategies, healthcare systems can offer person-centered, holistic care that adapts to the evolving needs of individuals with dementia and their families.

6. PREVENTION STRATEGIES

Prevention strategies for dementia focus on mitigating modifiable risk factors and promoting brain health to delay or reduce the incidence of cognitive decline. Chronic conditions such as hypertension, diabetes, and obesity are well-established contributors to vascular dementia and other subtypes [1]. Effective management of these conditions through medical treatment, lifestyle changes, and behavioral interventions is crucial. Smoking cessation is another key preventive measure, given the strong association between smoking and increased vascular and neurodegenerative risk [12]. Routine health screenings and proactive risk assessment are particularly important in at-risk populations, enabling early intervention before cognitive decline becomes apparent.

A critical aspect of dementia prevention involves enhancing cognitive reserve the brain's resilience to neuropathological damage. Educational attainment and lifelong learning are consistently linked with lower dementia risk. Engaging in mentally stimulating activities such as reading, playing musical instruments, and acquiring new skills can bolster neural pathways and improve adaptability [14]. Additional cognitive reserve-enhancing factors include bilingualism, which has been shown to delay dementia onset by several years, and occupational complexity, where careers involving problem-solving, planning, or social interaction may confer protective effects. Social engagement, including maintaining friendships, participating in group activities, and volunteering, contributes significantly to cognitive resilience [11].

Physical activity plays a pivotal role in maintaining cognitive and cardiovascular health. Regular exercise reduces inflammation, enhances cerebral blood flow, and supports neuroplasticity. Aerobic activities, resistance training, and balance exercises tailored to older adults not only improve overall well-being but have also been shown to reduce dementia risk [9,14]. Programs incorporating mindfulness, relaxation techniques, and mental fitness exercises are increasingly recognized as effective components of comprehensive brain health strategies.

Public health initiatives are essential in advancing dementia prevention at the population level. Community-based programs that promote physical activity, nutritious diets, and mental engagement have a profound impact on delaying cognitive decline. Equally important are public policies that ensure equitable access to education, healthcare services, and preventive resources, especially in underserved and aging populations. By integrating both individual-level behavior change and broader social support frameworks, a more effective and sustainable reduction in the global burden of dementia can be achieved.

7. CHALLENGES AND CONTROVERSIES IN DEMENTIA MANAGEMENT

Complex challenges and significant ethical considerations accompany dementia management. One key issue involves early diagnosis and disclosure. While identifying dementia in its early stages allows patients and families to plan for the future and potentially benefit from emerging therapies, it also carries

risks of psychological distress, anxiety, and stigma—particularly when no definitive cure exists [1]. Many patients may struggle with the emotional burden of a diagnosis, and clinicians must carefully balance the benefits of early detection with the potential harms of premature labeling. Stigma and social isolation remain prevalent and may deter individuals from seeking care or disclosing symptoms.

Another diagnostic dilemma lies in distinguishing age-related cognitive changes from pathological decline. Mild forgetfulness and slowed processing are common in normal aging, yet differentiating these from early dementia symptoms can be difficult. As a result, both underdiagnosis and overdiagnosis are concerns, leading to delays in intervention or unnecessary anxiety for patients and families [1].

The advent of anti-amyloid therapies, such as aducanumab and lecanemab, has sparked ongoing debate. While these drugs represent a shift toward disease-modifying approaches, their clinical benefits remain modest and primarily limited to early-stage Alzheimer's disease. Moreover, they carry notable risks, such as amyloid-related imaging abnormalities (ARIA), and require regular imaging and infusion protocols. Perhaps most controversially, their high cost—estimated at tens of thousands of dollars annually per patient—raises significant concerns about affordability and equitable access. These financial implications place pressure on public health systems and insurers and may widen existing disparities in dementia care, particularly for marginalized populations and those in low-resource settings.

Access to diagnostic resources and specialized care remains uneven across geographic and socioeconomic lines. Rural and underserved communities often lack access to neurologists, geriatricians, advanced imaging modalities, and biomarker testing, limiting the potential for early detection and evidence-based treatment [7]. Addressing these inequities is critical to achieving a fair and effective approach to dementia care. Efforts to expand telemedicine, train primary care providers in dementia recognition, and subsidize high-cost treatments may help bridge these gaps.

While recent advances offer hope, they also bring forth ethical, financial, and logistical challenges that require careful navigation. Transparent policymaking, equitable healthcare investment, and culturally sensitive care models are essential to ensuring that innovation benefits all individuals affected by dementia—not just a privileged few.

8. FUTURE DIRECTIONS IN DEMENTIA CARE

Innovative approaches to detection, treatment, and long-term management are shaping the future of dementia care. Blood-based biomarkers are emerging as promising, non-invasive alternatives to cerebrospinal fluid (CSF) analysis and imaging, offering the potential for broader, earlier detection of dementia across various settings [3]. These assays, capable of detecting amyloid-beta, tau, and neurofilament light chain, may soon become accessible tools for primary care providers, facilitating timely diagnosis and intervention. Concurrently, advances in personalized medicine are creating opportunities to tailor treatments to individual genetic, biomarker, and clinical profiles, thereby optimizing therapeutic efficacy and minimizing adverse effects [2].

Research into disease-modifying therapies continues to evolve, with promising developments in agents targeting amyloid, tau, and neuroinflammatory pathways [1]. Beyond monoclonal antibodies, investigators are exploring gene therapy strategies aimed at correcting or silencing pathogenic genetic variants, particularly in familial Alzheimer's disease. Targeted molecular therapies, including antisense oligonucleotides and small-molecule inhibitors, are also under active investigation for their ability to modulate protein expression or prevent misfolding and aggregation. These cutting-edge approaches may eventually shift the therapeutic landscape from symptomatic management toward prevention and neuroprotection.

Technology is also poised to revolutionize dementia care. Wearable sensors, smartphone applications, and digital platforms now allow for remote and continuous monitoring of cognition, behavior, sleep, and activity levels, enabling earlier recognition of changes and more proactive management. Telemedicine continues to bridge access gaps, especially in rural and underserved populations. Additionally, artificial intelligence is being integrated into cognitive assessment platforms, diagnostic decision-support systems, and personalized care planning tools, enhancing efficiency and precision in clinical practice.

Together, these advances signify a shift toward a more proactive, individualized, and technology-integrated model of dementia care. Continued investment in translational research, healthcare infrastructure, and equitable access to innovation will be vital to fully realizing the potential of these emerging strategies and improving the lives of those affected by dementia.

CONCLUSION

The review of dementia in older adults highlights the complexity of dementia and underscores the importance of advancing care and prevention strategies for older adults. Key findings include the growing prevalence of dementia globally, the diversity of its subtypes, and the significant progress made in diagnostic tools, management strategies, and prevention initiatives [1]. From cognitive assessment techniques and biomarker innovations to lifestyle modifications and community interventions, a multifaceted approach is essential to effectively address this escalating public health challenge [13].

Managing dementia requires a holistic approach integrating medical, psychological, and social support for patients and caregivers. Interdisciplinary care models that involve healthcare professionals, family members, and community resources are vital in providing comprehensive care tailored to individual needs. Prevention efforts focusing on modifiable risk factors, cognitive reserve-building, and public health policies play a pivotal role in reducing the incidence of dementia.

This review calls on governmental officials, healthcare professionals, policymakers, and researchers to prioritize dementia as a public health imperative. Collaborative efforts are needed to expand access to diagnostic and care resources, address disparities, and invest in innovative research on disease-modifying therapies and early detection methods. Working collectively can advance our understanding and management of dementia, improving outcomes for patients, families, and society.

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CONFLICT OF INTEREST

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