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Physical and Psychological Health Deterioration of Older Adults with Alzheimer's Disease

Rungnapha Khiewchaum
Phrapokklao Nursing College, Chanthaburi Faculty of Nursing,
Praboromarajchanok Institute Ministry of Public Health

Abstract

Alzheimer's disease (AD) constitutes a significant global public health challenge, with projections indicating a substantial rise in prevalence in the forthcoming years. This paper offers a comprehensive synthesis of current data and research findings on AD, focusing particularly on global and regional perspectives, with emphasis on Asian countries such as South Korea and Thailand. It examines the complex physical and psychological manifestations of AD in older adults, including cognitive impairment and behavioral changes, and explores the underlying neurobiological mechanisms. Furthermore, it discusses interventions aimed at addressing cognitive deficits, behavioral disturbances, and psychological well-being in individuals with AD, highlighting the importance of early detection and holistic care approaches. Understanding the multifaceted nature of AD and implementing targeted interventions tailored to the needs of affected individuals and their caregivers are crucial steps in alleviating the burden of this debilitating neurodegenerative condition on individuals, families, and society.

Key words: Alzheimer's disease, physical and psychological problems, older adults

Corresponding author: Rungnapha Khiewchaum E-mail: rungnapha@pnc.ac.th

Statistics of Older Adults with Alzheimer's Disease

Alzheimer's disease (AD) is the most common cause of dementia and is a significant public health challenge. The World Health Organization (WHO) reported that the number of individuals with Alzheimer's dementia is 55 million by 2022 (Shin, 2022). Approximately the global number of older adults with AD has increased to 78 million by 2030 and 139 million by 2050. In 2020, AD affected 5.8 million older adults in the United States, and it was the fifth leading cause of mortality among older adults (Hung, 2021). The percentage of people with AD depends on their age: 5.0% of people aged 65 to 74, 13.1% of people aged 75 to 84, and 33.2% of people aged 85 and older have Alzheimer's dementia (Rajan, Weuve, Barnes, McAninch, Wilson, Evans, 2021). By 2050, the global number of people age 65 and older with AD is expected to reach 152 million (GBD 2019 Dementia Forecasting Collaborators, 2022), and 90% of older adults with AD are in some lower and middle-income countries (Alzheimer's Disease International, 2022). After older adults deterioration by aging, they have memory problems such as recent and recall memories impacting their long-life life and family because of various physical and psychological challenges.

Likewise, for Asian AD situation, in Korea the number of individuals with dementia aged 65 and older reached 840 thousand (10.33% of older adults) in 2022, and in 2032, it was forecasted that the incidence of dementia in South Korea would surge by an additional 1.6 times (Kim & Lee, 2024). In Thailand, the statistics of older adults with AD shows that there are the number of older adults with AD more than 1 million by 2021 and found that female is more like to be patients with AD than male (Foundation of Thai Gerontology Research and Development institute, 2021). The percent of Thai individuals with AD also depends on their age: 7.10% of people age 60 to 69, 14.70% of people age 70 to 79, and 32.50% of people age more 80 (Chalit, Winai, & Teeranun, 2022). Not surprisingly, older adults with AD become global health issue because AD impact to physical and psychological health for older adults.

Physical problems of older adults with AD

The brain atrophy including the entorhinal cortex, hippocampal formations, the temporal lobe, the parietal lobe, and the prefrontal lobe (Braak & Braak, 1996). Also, the brain atrophy slowly happens; however, healthy aging change from 0.2% to 0.41% of the brain volume disappears per year (Jahn, 2022). AD results in physical disability such as cognitive loss and loss of functional ability as the disease advance impaction on older adults and families see Figure 1.

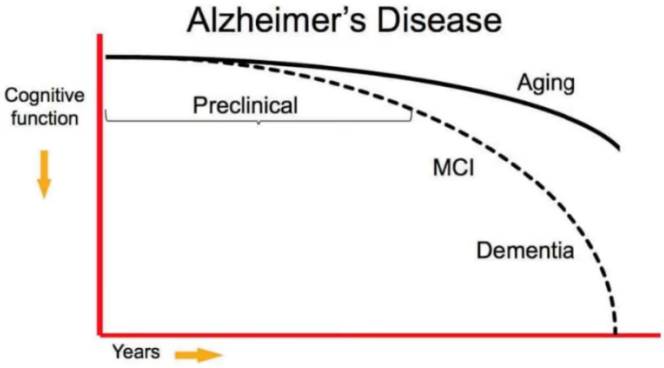


Figure 1: Cognitive function related to progress of Alzheimer's disease (https://altoida.com/blog/understanding-the-stages-preclinical-alzheimers-disease/)

Physical problems in older adults

Cognitive impairment impacts a significant problem for older adults, manifesting in various forms such as memory loss, executive dysfunction, and difficulties in decision-making. Physical problems often occur in older adults including:

Memory deficit:

The memory loss of older adults associated with Alzheimer's disease continues and deterioration of the neural network, affecting the ability to their function at work or at home. Memory impairment of older adults with AD results from reduction of the right medial temporal lobe and the right hippocampus impacting on a memory task including encoding, recall, and recognition (Jahn, 2013). As a result, symptoms of memory loss in Older adults with Alzheimer's may include: 1) repeating statements and questions over and over; 2) forgetting conversations, appointments or events, and not remember them later; 3) routinely misplacing possessions, often putting them in illogical locations; 4) getting lost in familiar places; 5) forgetting the names of family members and everyday objects; and 6) taking trouble finding the right words to identify objects, express thoughts or take part in conversations (Budson & Solomon, 2021; Zvěřová, 2019; Hazan, 2020). As can see brain atrophy (e.g., loss of medial temporal and hippocampal volume) affects episodic memory and tasks of speed and executive function, and older adults may lead to sign increasing memory decline in the future.

Thinking and reasoning:

There is age-related to decrease in reasoning performance as reasoning deficiency. In thinking and reasoning deficits, older adults could abstractly think and construct logical inferences; however, they forget the inference because of working memory failures and reducing speed of information (Kumar, Sidhu, Goyal, Tsao, & Doerr, 2022). Also, AD leads to difficulty concentrating and thinking, especially about abstract concepts such as numbers. Consequently, older adults with AD have multitasking challenging such as managing finances, balancing checkbooks, or paying bills on time. Four abstract thinking measures measured in older adults with AD consist of: 1) proverb interpretation (e.g., Birds of a feather flock together); 2) labeling similarities between words and concepts (e.g., table-chair, apple-pear, love-hate); 3) identifying variances between words and concepts (e.g., car-train, child-dwarf, airplane-bird); and 4) explaining absurdities (e.g., Is my brother-in-law a man or a woman? (Goranson, 2001). Therefore, older adults with AD may be unable to recognize and deal with numbers as declining thinking and reasoning capabilities and the early stage of older adults with AD is related to reduce verbal abstract thinking and reasoning abilities.

Making judgments and decisions:

Judgment is identified as the ability to make decision after careful concern of available information, contextual factors, possible solutions and probable outcome (Fischhoff & Broomell, 2020). Moreover, the concept of judgment is related to cognitive domains including memory, language, sustained attention, reasoning, and the executive function (Harvey, 2019). Also, the executive function is associated with the capability to involve in complex and objective behavior requiring working memory, planning, organization, sequencing and abstraction (Cristofori, Cohen-Zimerman, & Grafman, 2019). Older adults with AD have a decrease in the capability to build reasonable decisions and judgments in their daily life. For example, older adults may create poor or unusual selections in social interactions or wear dresses that are incorrect for the season. It may be more suffered to respond effectively to daily troubles, such as food boiling on the stove or unexpected driving situations. Therefore, older adults with AD may have impaired judgment and decision and they may have challenge of problem solving and decision making, and it impacts on older adults with AD in everyday situations. Not only older adults with AD have judgment and decision problems, but they also have cognitive impairment. As a result, when older adults with AD live alone and they may encounter suffer daily life; especially, health care providers need to address how they will be able to live dependently in a safe manner and make effective decisions.

Planning and performing familiar tasks:

When Older adults with AD have frontotemporal lobar degeneration (FTLD), they encounter progressive impairment in behavior and personality including planning and performing familiar tasks (Lima-Silva et al., 2015). Older adults with AD are difficult to do routine daily activities that require sequential steps (e.g., planning and cooking a meal) (Tabira et al., 2024). Likewise, older adults with AD frequently forget how to executive basic daily works such as dressing, bathing, or toileting that they may not know how to do step by step for preparing routine daily activities and become a struggle as the disease advancements (Guarino, Favieri, Boncompagni, Agostini, Cantone, & Casagrande, 2019). Moreover, older adults with advanced AD may find hard to plan and be complete activities they regularly do such as they could not change settings on a television or making a cup of coffee, and older adults with AD may not be able to memorize a familiar location (Roll, Giovannetti, Libon, & Eppig, 2019). In summary, older adults with AD need to be solved by using early screening and rehabilitating before delayed stage of AD.

Preserved skills:

Previous study indicated that older adults with AD have a lesion of the right hemisphere will disturb complex skills that involve semantic memory (Snowden et al., 2018). Older adults with AD have loss of cognitive function, they could not do a variety of cognitive skills as preserved skills (PS) (e.g., music, reading or listening to books, telling stories and reminiscing, singing, listening to music, dancing, drawing, or doing crafts) (Billot et al., 2020). The significant factor associated with PS in older adults with AD is their unique life experience and life experience consist of cohort influences, cultural and religious experiences, and societal effects (Manning, Ferris, Rosario, Prues, & Bouchard, 2019). Cognitive skills (e.g., musical and art skills) may be preserved longer because there is loss of cognitive function of the brain atrophy among older adults (Böttcher et al., 2022) Therefore, early screening loss of cognitive function in older adults may reduce PS problem, and design interventions and environments should purposefully activate PS among older adults with AD.

Changes in personality and behavior:

Alzheimer's disease (AD) patients are even more capable to get lost in both familiar and unfamiliar environments, and it impacts on manifest mental and behavioral difficulties and moods resulting from brain change. Problems may include the following: 1) depression; 2) apathy; 3) social withdrawal; 4) mood swings; 5) distrust in others; 6) irritability and aggressiveness; 7) changes in sleeping habits; 8) wandering; 9) loss of inhibitions; and 10) delusions, such as believing something has been stolen (Jaroudi, Garami, Garrido, Hornberger, Keri, & Moustafa, 2017; Caselli et al., 2018; Terracciano, & Sutin, 2019). Therefore, impulsive behavior or moods is associated with getting lost, and observing in early AD can help to reduce impact of AD. Wayfinding to support formulating a plan and monitor the plan execution may support older adults with AD.

Psychological problems of older adults with AD

Besides cognitive and functional deficits, behavioral and psychological challenge of older adults illustrate a characteristic feature of AD, and there is at least one neuropsychiatric difficulty seen in more than 80% of AD patients (Kimura et al., 2019). As a result, psychological disabilities of older adults with AD extremely impact the quality of life (QoL) of both patients and caregivers (Barbe et al., 2018; Akpınar, Küçükgüçlü, Akyol, & Işık, 2020). Therefore, there are many psychological problems of AD patients including:

Depression:

Up to 80% of older adults with AD have depression (Bessey & Walaszek, 2019), and it is second to apathy. 32 % of older adults with mild cognitive impairment (MCI) found depressive symptom (Husebo, Ballard, Sandvik, Nilsen, & Aarsland, 2011). Late-life depression results from atrophy of various brain structures including low gray matter volumes in the frontal-temporal lobes, hippocampus, para-hippocampal gyrus, amygdala, putamen, pallidum, and thalamus (Subramanian, Oughli, Gebara, Palanca, & Lenze, 2023).

Sleep disruption:

Not only atrophy of brain does lead to depression, but it also affects sleep-wake cycle of older adults with AD because of change of rest-activity circadian rhythms including low amplitude, fragmentation of loss of rhythms, and decreased sensitivity to suprachiasmatic nucleus (SCN) time cues (e.g., light exposure) (Irwin, & Vitiello, 2019; Casagrande, Forte, Favieri, & Corbo, 2022). In older adult with AD, circadian dysfunction deteriorates cause an inability to consolidate wakefulness and the progress of an abnormal 24-h rhythm, decrease REM latency, and increase proportion of REM leading to poor sleep efficiency (Dijk & Landolt, 2019). Moreover, AD patient with depressive disorder is more like to increase risk of suicide (Kułak-Bejda, Bejda, & Waszkiewicz, 2021).

Therefore, older adults with AD should be received by using both pharmacological (e.g., selective serotonin reuptake inhibitors (SSRI) as antidepressants) and nonpharmacological interventions (e.g., emotion-orient therapies, brief psychotherapies, and sensory stimulation therapies) to help decrease depressive challenge and to improve their QoL.

Apathy:

Older adults with AD have cortical dysfunction in the posterior cingulate or inferior temporal cortex; as a result, they become apathy patients (Burke, Goldfarb, Bollam, & Khokher, 2019). Older adults with AD suffer from apathy that they may frequently deny feeling depression and may not approve the specific symptoms of depressive disorder. Therefore, using pharmacology may needed in reducing an apathy symptom including cholinesterase inhibitors (e.g., donepezil, galantamine, and rivastigmine) (Cohen-Mansfield, Golander, & Cohen, 2017). Also, nonpharmacological treatment may be required by using family support (e.g., offering engagement or motivation) to express their concerns to their loved one becoming depressive patient.

Anxiety:

40 % of Older adults with AD occurs anxiety symptoms such as tension, restlessness, irritability, fear of being left loneliness, or worry and apprehension, and activities of Daily Living (ADL) of older adults with AD were related to comorbid anxiety, depression, and behavioral disturbances (Mendez, 2021). However, anxiety symptom of AD patient is not particular and overlap with the symptoms of other mental health deficits (Angermann & Ertl, 2018). Therefore, anxiety symptom should be assessed by effective tools to help identify and treat AD patients and may have specific clinical significance for the medical management and daily care of AD patients.

Aggression:

Aggressive and impulsive behaviors are of particular significance because there is a direct influence on social functioning and their aggressive symptom affect injuries to self and others **(**Yu, Topiwala, Jacoby & Fazel, 2019). Previous study reported that nonaggressive patients have become aggressive within 24 months, and using antipsychotic medications may increase aggressive challenge in AD patients (Carrarini et al., 2021). As a result, family caregivers became victims of assault when older adults with AD have aggressive disorder. Therefore, healthcare providers should prevent aggression or the impact of aggressive symptoms to decrease patient and family caregiver suffering.

Conclusion

Alzheimer's disease (AD) stands as a formidable global health challenge, with projections indicating a substantial surge in prevalence, particularly among aging populations. The cognitive, physical, behavioral, and psychological manifestations of AD levy profound burdens on both individuals and caregivers. Effective management necessitates a holistic approach involving early detection, tailored treatment regimens, and comprehensive support services. Collaboration among healthcare sectors, research institutions, and communities is imperative for advancing preventative strategies, refining diagnostic precision, and optimizing therapeutic outcomes. Through concerted efforts addressing AD's multifaceted complexities, healthcare providers endeavor towards a future where the disease's impact is mitigated, and the well-being of affected individuals is markedly improved.

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