

**How to Cite:**

Jinu, K. V., Goothy, S. S. K., & Karunakaran, B. (2022). Dementia: A silent killer which kills millions in its wake: An overview. *International Journal of Health Sciences*, 6(S2), 6831–6836. <https://doi.org/10.53730/ijhs.v6nS2.6656>

## **Dementia: A silent killer which kills millions in its wake: An overview**

**Jinu K V**

Assistant professor, Department of Physiology, D.M. Wayanad Institute of Medical Sciences, Wayanad, Kerala, India. 673577

**Sai Sailesh Kumar Goothy**

Associate professor, Department of Physiology, R.D.Gardi Medical College, Ujjain, Madhya Pradesh, India. 456001

**Balaji Karunakaran**

Professor, Department of Biochemistry, D.M. Wayanad Institute of Medical Sciences, Wayanad, Kerala, India. 673577

Corresponding author email: [drbalajikarunakaran@gmail.com](mailto:drbalajikarunakaran@gmail.com)

**Abstract**--WHO defines dementia as a progressive chronic syndrome characterized by deterioration of cognitive function much beyond what is observed in the normal aging process. The impairment in various levels of cognitive functions such as short and long-term memory, abstract thinking, learning capability, orientation, comprehend various tasks, language, and judgment are commonly observed in patients with dementia. Further, the situation can get worsen by loss of emotional control, social behavior, motivation, etc., and this disability makes the dependency. A detailed literature review was performed through MEDLINE, Google, PubMed, Medline, Eric, Frontiers, and other online journals using the terms “Dementia”, “Risk factors of dementia”, “its types”, “prevalence”, and “available treatments of dementia”. The present article was based on these relevant terminologies. Progressive deterioration in cognition and motor functions is an undesired consequence of dementia, which has very limited diagnostic and therapeutic options. So, its quite mandatory to discover new diagnostic techniques as well as therapeutic strategies to conquer the challenge. Since pharmacological intervention only provides symptomatic relief, more and more non-pharmacological therapies should be invented in order to delay or prevent unhealthy aging.

**Keywords**--dementia, ageing, risk factors, cognition.

## **Introduction**

WHO defines dementia as a progressive chronic syndrome characterized by deterioration of cognitive function much beyond what is observed in the normal aging process. The impairment in various levels of cognitive functions such as short and long-term memory, abstract thinking, learning capability, orientation, comprehend various tasks, language, and judgment are commonly observed in patients with dementia. Further, the situation can get worsen by loss of emotional control, social behavior, motivation, etc., and this disability makes the dependency worse among older patients. The effects of dementia on an individual's quality of life vary, depending upon the severity of the disease and the person's personality before the illness. The onset of signs and symptoms such as abnormal forgetfulness, losing track of time (fail to stay aware of the time, seasons), and getting lost in familiar places (they may also forget where they are standing or how they reached there) is very gradual and is considered as the first stage of dementia. Due to the unawareness and lack of understanding, diagnosis at this stage is challenging. As the disease progresses, the individual becomes more forgetful about the recent past events, sometimes forgets the names of people who are close to them (forget the name of offspring or parents), and often they get lost in their own home. Subsequently, the patients develop increased difficulty in communication, develop behavioral changes such as unnecessary wandering, aggression, repeated questioning eventually leading to total dependency and inactivity in later stages. Hence dementia affects not only patients' physical, psychological, social, and economic health, but it severely disturbs their caregivers, families, and social network. Physical, emotional, and economic pressures can cause great stress to families and caregivers.<sup>[1]</sup> Hence dementia patients will need constant attention and support from various health, finance, social organizations, and law system. Dementia has a consequential economic implication directly associated with providing necessary care and support. In 2015, the health care cost associated with dementia was projected at 1.1% of global gross domestic product (GDP) with an estimate of six lakhs crores per year.

## **Materials and Methods**

A detailed literature review was performed in December 2021 through MEDLINE, Google, PubMed, Medline, Eric, Frontiers, and other online journals using the terms "Dementia", "Risk factors of dementia", "its types", "prevalence", and "available treatments of dementia". The present article was based on these relevant terminologies.

## **Risk Factors**

Many factors are known to increase the risk of dementia. Aging, family history, and heredity are a few factors considered most important that can't be changed, however, emerging evidence suggests that several lifestyles and environmental factors which are modifiable can also influence in developing dementia. Aging is one of the greatest risk factors for developing Alzheimer's disease (AD),<sup>[2]</sup> with most individuals being above 65 years. According to statistics, one in nine of 60-80 years and about one-third of people above 85 have Alzheimer's disease (Rocca

et al 1998). The increased probability of chromosomal abnormality with advanced parental age at childbirth is strongly correlated with an increased risk of AD, <sup>[3]</sup> although a few studies have failed to replicate such an association. The influence of gender in developing AD is also observed in elderly patients. <sup>[4]</sup> The rate of AD was reported to be higher in women compared to men post 85 years of age. <sup>[5]</sup> However, such gender differences in the rate or risk of developing vascular dementia (VaD) are not observed among elderly patients. Although the overall incidence of VaD is reported to be lower in women. <sup>[6]</sup> Family history and genetics are the other risk factors. The risk increases if anyone in the close family (parent, sister or brother) has the disease and this risk is doubled when more than one member of the family has a history of dementia. <sup>[7]</sup> When diseases tend to be prevalent in families, they either have a strong genetic background or genetic history together with environmental factors play a vital role in the onset of dementia. Researchers have found that the presence of certain abnormal proteins like apolipoprotein (APOE-e4), Amyloid precursor protein (APP), presenilin-1 (PS-1), and presenilin-2 (PS-2) enhance the risk of AD. <sup>[8]</sup> Type 2 diabetes, high blood pressure, high total blood cholesterol levels, depression, obesity, smoking, physical inactivity, high alcohol consumption and unhealthy diet are few of the other factors that further increase the risk of developing dementia. <sup>[9]</sup>

### **Common forms of dementia**

Dementia is categorized into various subtypes based on its causes. Half of the dementia population is affected by Alzheimer's disease. Vascular dementia (VaD) accounts for 20–25% of cases and is the second-highest in the incidence rate after Alzheimer's disease, followed by mixed dementia which is about 5–10%. Dementia is also associated with other neurodegenerative diseases such as Parkinson's, Huntington's disease, Pick's disease, and Creutzfeldt–Jacob disease, some of which are often classified as dementia with Lewy bodies or frontotemporal dementia. <sup>[10]</sup> Dementia can also be a consequence of physical brain injury and/or normal pressure hydrocephalus. In AD, the accumulation of beta-amyloid plaques and tau protein tangles inside as well as in synapses, block nerve cell communication, which eventually disrupts various processes of cell survival. The destruction of the synapses and abnormal nerve cell death leads to the symptoms of Alzheimer's disease-like loss of memory, judgment incapability, change in personality, difficulty in carrying daily activities, and all other symptoms of AD. <sup>[11]</sup> In VaD, reduce blood flow to the brain due to stroke kills the neuronal cells. This may begin as mild but due to cumulative damage caused by multiple strokes or other conditions that affect smaller blood vessels, cognition ability can gradually decline. <sup>[12]</sup> An abnormal protein called alpha-synuclein get deposited in cognitive areas which leads to Lewy body dementia (LBD). These deposits are otherwise called Lewy bodies and can lead to loss of thinking ability, memory, movement, behavior and mood. LBD is considered as one of the common causes of dementia, after Alzheimer's and vascular disease. <sup>[13]</sup> The progressive degeneration of neurons in the temporal and frontal lobes (which is a key region for decision-making, behavioral control, emotion, and language) may lead to frontotemporal dementia.

## Prevalence

Alzheimer's disease is the most common neurodegenerative disorder with 50 million individuals currently affected worldwide. Several demographic, public health and epidemiological data stipulate that the dementia population will continue to grow, especially among the old age group. According to WHO, in 2010 35.6 million people had dementia worldwide and it is likely to increase to 65.7 million in the next 20 years. With 7.7 million new cases diagnosed every year, the total number of dementia patients is expected to rise to 115.4 million by 2050. One new case in every four seconds is a clear warning about the deteriorating mental health of the elderly. Developing countries with rapidly increasing elderly populations are likely to see a major increase in the incidence of dementia. <sup>[14]</sup>

Despite a serious and growing problem of dementia incidence in India, a lack of awareness has led to neglecting this disease burden in healthcare. According to a recent report, over forty lakh Indians (3.7 percent of the population), 60 years or older suffer from dementia. A recent conference (19th national conference of the Alzheimer's and Related Disorders Society of India; ARDIS), has advocated the need for more attention to dementia healthcare, considering the growing number of this incidence (7 million by 2020 and 13 to 14 million by 2050). Few studies from several urban regions of India have reported prevalence rate of 2.44 to 4.1% (Western India), 1.83% (North India) 0.8 to 1.28% (East India) and 3.6% (South India). <sup>[15]</sup> A study among the Dogra population (North India) reported incidence rate of 5.34 per 1000 person years. <sup>[16]</sup> In a study from South India, the mortality risk from dementia was reported to be 2.3 and 2.65 times higher in older people without (Jotheeswaran, 2010) or with the incidence of stroke. <sup>[15]</sup>

## Available treatments for dementia

There are no known therapeutic or preventive measures for most types of dementia, although the loss of cognitive abilities can be delayed to provide short-term relief. Dementia is currently managed mainly by pharmacological and non-pharmacological interventions. The drugs that are currently used for the treatment of Alzheimer's disease and other related types of dementia are acetylcholinesterase inhibitors (AChEIs; such as donepezil, rivastigmine and galantamine) and N-methyl-d-aspartate (NMDA) receptor antagonists such as Memantine which is used with or without a AChEI. <sup>[17]</sup> Drug-related factors, such as adverse effect profiles are no exception here. Cardiovascular conditions such as atrioventricular block and sick sinus syndrome are considered contraindications for treatment with AChEIs. <sup>[18]</sup> Nausea, vomiting, diarrhoea, decrease or loss of appetite, sleep disturbances, vivid dreams, nightmares and increase risk of syncope are the common side effects of AChEIs. <sup>[19]</sup> Non-pharmacological strategies such as cognitive exercise, environmental interventions and physical activities, delay the progression of neurodegenerative disorders. <sup>[20,21]</sup> Physical activity is reported to improve the cognitive and general cardiovascular health and can reduce risk factors such as hypertension and diabetes. Strategies such as music therapy, aromatherapy, pet therapy and massage are also reported to be beneficial in improving cognitive health. <sup>[22,23,24,25,26]</sup>

## Conclusion

Progressive deterioration in cognition and motor functions is an undesired consequence of dementia, which has very limited diagnostic and therapeutic options. So, its quite mandatory to discover new diagnostic techniques as well as therapeutic strategies to conquer the challenge. Since pharmacological intervention only provides symptomatic relief, more and more non-pharmacological therapies should be invented in order to delay or prevent the unhealthy aging.

## References

1. Schulz R, Sherwood PR. Physical and mental health effects of family caregiving. *Am J Nurs*. 2008 Sep; 108(9Suppl):23-7. doi: 10.1097/01.NAJ.0000336406.45248.4c
2. Kukull WA, Higdon R, Bowen JD, McCormick WC, Teri L, Schellenberg GD, van Belle G, Jolley L, Larson EB. Dementia and Alzheimer disease incidence: a prospective cohort study. *Arch Neurol*. 2002 Nov;59(11):1737-46. doi: 10.1001/archneur.59.11.1737.
3. Urakami K, Adachi Y, Takahashi K. A community-based study of parental age at the birth of patients with dementia of the Alzheimer type. *Arch Neurol*. 1989 Jan;46(1):38-9. doi: 10.1001/archneur.1989.00520370040016.
4. Jouan-Flahault C, Seroussi MC, Colvez A (Absence of a relationship between senile dementia and parental age. A case report survey in Upper Normandy. *Rev Epidemiol Sante Publique* 1989; 37:73-5
5. Andersen K, Launer L.J, Dewey M.E, et al. Gender differences in the incidence of AD and vascular dementia: The EURODEM Studies. EURODEM Incidence Research Group. *Neurology* 1999; 53:1992-7
6. Ruitenberga A, Ott A, van Swieten J.C et al (2001). Incidence of dementia: does gender make a difference? *Neurobiol Aging* 2001; 22:575-80.
7. Richard F, Amouyel P (2001). Genetic susceptibility factors for Alzheimer's disease. *Eur J Pharmacol*,412:1-12.
8. Corder E.H, Saunders A.M, Strittmatter W.J et al. Gene dose of apolipoprotein E type 4 allele and the risk of Alzheimer's disease in late onset families. *Science*1993; 261:921-3
9. Jesper Skov Neergaard, Neergaard JS, Dragsbæk K, Hansen HB et al. Late-Life Risk Factors for All-Cause Dementia and Differential Dementia Diagnoses in Women: A Prospective Cohort Study. *Medicine (Baltimore)* 2016; 95(11):1-7.
10. Liu C.K, Tai C.T, Lin R.T et al. Epidemiology of dementia in Taiwan. *Appl Psychol Res* 2000; 7:157-69.
11. Seloe D.J. Defining molecular targets to prevent Alzheimer disease. *Arch Neurol* 2005; 62:192-5.
12. Carter J, C. F Lippa.. $\beta$ -Amyloid, Neuronal Death and Alzheimers Disease. *Current Molecular Medicine*2001;1(6):733-7.
13. Costantinoladecola .The Pathobiology of Vascular Dementia, *Neuron* 2013; 80[4(20)]:844-866.
14. WHO. Active aging: A policy framework health report Geneva. Geneva: World Health Organization; 2002

15. Ian McKeith. Dementia with Lewy bodies. *Dialogues Clin Neurosci.* 2004; 6(3): 333–341.
16. Das S, Paul N, Hazra A, Ghosal M, Ray BK, Banerjee T.K et al. Cognitive dysfunction in stroke survivors: Community-based prospective study from Kolkata, India. *J Stroke Cerebrovasc Dis.* 2013; 22(8):1233-42.
17. Jotheeswaran AT, Williams JD, Prince MJ. Predictors of mortality among elderly people living in a South Indian urban community; a 10/66 Dementia research Group prospective population-based cohort study. *BMC Public Health* 2010; 10:366
18. Grutzendler J, Morris J.C. Cholinesterase inhibitors for Alzheimer's disease. *Drugs* 2001; 61:41-52.
19. Hogan D.B, Bailey P, Carswell A et al. Management of mild to moderate Alzheimer's disease and dementia. *Alzheimers Dement* 2007; 3:355-84
20. Rodda R, Carter J. Cholinesterase inhibitors and memantine for symptomatic treatment of dementia. *BMJ* 2012; 344: e2986.
21. Hogan D, Bailey P, Black S et al. Diagnosis and treatment of dementia: nonpharmacologic and pharmacologic therapy for mild to moderate dementia. *CMAJ* 2008; 179:1019-26.
22. Jedrzejewski M.K, Lee V.M.Y, Trojanowski T.Q. Physical activity and cognitive health. *Alzheimer's Dement* 2007; 3:98-108. 20.
23. Koger S.M, Brotons M. Music therapy for dementia symptoms. *Cochrane Database Syst Rev* 2000; (2):CD001121.
24. Jimbo D, Kimura Y, Taniguchi M, Inoue M, Urakami K (2009). Effect of aromatherapy on patients with Alzheimer's disease. *Psychogeriatrics* 2009;9(4):173-9.
25. Susan L. Filan and Robert H. Llewellyn-Jones. Animal-assisted therapy for dementia: a review of the literature. *International Psychogeriatrics* 2006;18(4):597–611
26. Juan Rodríguez-Mansilla, MaríaVictoria, González-López-Arza et al. Ear therapy and massage therapy in elderly people with dementia a pilot study. *Journal of Traditional Chinese Medicine* 2013; 33(4):461-46.