International Journal for Research in Engineering Application & Management (IJREAM)
ISSN : 2454-9150 Vol-07, Issue-08, NOV 2021

Alzheimer's Disease: A Comprehensive Overview

Shivagonda Patil, Department of Computer Science & Engineering, VTU, Belagavi, India

P. Sandhya, Department of Computer Science & Engineering, VTU, Mysuru, India

Manjunath B Talawar, Department of Computer Science & Engineering, JSSATE, VTU, India

Abstract- Alzheimer's disease (AD) is most generally occurring disease in the aged people. According to the World Health Organisation, about 50 million people will have dementia by 2020, with about 10 million new cases recorded each year. AD is a reformist neurodegenerative sickness that will harms memory and mental decisions. The growing lifecycle of the aging people in the global population, the neurodegenerative diseases occurrence rate has increased. In this paper, we provide an overview of research effort done to understand and analyze Alzheimer's Disease, as well as recent work done for those who are affected.

Index Terms – ***Alzheimer's Disease (AD), Dementia, Neurophysiology, Biomarkers***

I. INTRODUCTION

Dementia [10] is a set of symptoms categorized by disorder of many brain functions, as well as memory, thinking, direction, learning capacity, language, and decision. Alzheimer's disease [9],[11],[25] is the most ubiquitous type of dementia, representing 60-70% of cases. Alzheimer's syndrome can be distinguished from normal age-related cognitive impairment, which develops steadily and is associated with less disability. It is common for the disease to begin with mild symptoms and progress to serious brain injury. Alzheimer's sickness is at present positioned as the sixth driving reason for death in the United States, albeit late gauges show that it could rate third, behind coronary illness and malignancy, as a reason for death for the old.

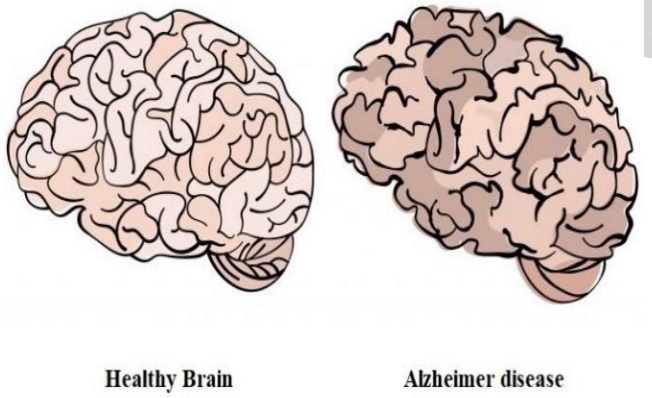

Figure 1 Healthy Brain Vs Alzheimer Disease [15]

The above Figure 1 shows the heathy brain vs Alzheimer disease, to understand how the changes will happens to brain after AD. The realisation of the cognitive and behavioural symptoms of dementia and their contribution to underlying brain disease has been one of neuropsychologists' greatest obstacles over the last 50 years. With the ageing of the population and the age-related presence of certain dementia-producing neurodegenerative disorders, this problem has evolved significantly over time.

Alzheimer's disease might be distinct according to recent intentions, 3 clinical stages [6],[7] of:

- Pre-symptomatic Alzheimer's disease [15],[16] which can last for years or decades before the overabundance of A in the brain reaches a critical stage, triggering the amyloid cascade.
- Early-stage pathology, ranging from mild neuronic dystrophy to early-stage Braak pathology, is gifted in the pre-dementia stage of Alzheimer's disease, which can last for several years based on human endurance and brain reserve.
- The clinically established dementia period of Alzheimer's disease, in which depressive symptoms and functional dysfunction are significant enough to pass the dementedness threshold.

A. Alzheimer's disease different Stages

Alzheimer's disease generally progresses in 3 phases [6],[7]: slight, modest, and Severe. Since AD disturbs people with unpredictable conditions, anyone can experience side effects or advance through the stages in unexpected ways.

 DOI : 10.35291/2454-9150.2021.0598

Table 1 Main Phases of AD

In early stage (Mild)	In Middle-stage (Moderate)	In Late-stage (Severe)
In the beginning phase of Alzheimer's, an individual may work freely. The individual may in any case drive, work and be essential for social exercises. Notwithstanding this, the individual may feel as though the person is having memory slips, for example, failing to remember recognizable words or the area of ordinary items. Manifestations may not be generally evident at this stage; however family and dear companions may pay heed and a specialist would have the option to recognize indications utilizing certain demonstrative instruments.	Center stage Alzheimer's is normally the longest stage and can keep going for a long time. As the infection advances, the individual with Alzheimer's will require a more noteworthy degree of care. During the center phase of Alzheimer's, the dementia manifestations are more articulated. the individual may confound words, get baffled or furious, and act out of the blue, for example, declining to wash. Harm to nerve cells in the cerebrum can likewise make it hard for the individual to communicate considerations and perform routine undertakings without help.	Dementia symptoms are at their worst in the final stages of the illness. People lose their ability to respond to their current situation, have a conversation, and, finally, monitor growth. They can say whatever words or sounds they choose, but conveying pain is difficult. As memory and intellectual abilities keep on deteriorating, critical character changes may happen and people need broad consideration.
Regular challenges include: • Coming up with the correct word or name. • Remembering names when acquainted with new individuals. • Having trouble performing errands in social or work settings. • Forgetting material that was simply perused. • Losing or losing a significant item. • Experiencing expanded issue with arranging or sorting out.	**Side effects, which change from individual to individual, may include:** • Being neglectful of occasions or individual history. • Feeling surly or removed, particularly in socially or intellectually testing circumstances. • Being unable to review personal records such as their location or phone number, as well as the high school or school they attended. • They are unaware about where they are or what day it is. • requiring assistance in choosing suitable clothes for the season or event.	**At this stage, people may:** • Require nonstop help with day by day close to home consideration. • Lose familiarity with late encounters just as of their environmental factors. • Experience changes in actual capacities, including strolling, sitting and, at last, gulping • Have trouble imparting. • Become defenseless against contaminations, particularly pneumonia.

II. Related Work:

A. *Ad General Review*

The cognitive judgment and weakens memory leads to progressive for dementia[13]. dementia has basic characteristic to neuropathological findings [2] consist intracellular neurofibrillary masses and signs involving of amyloid protein. Clear symptoms of AD or dementia will not be faced by all people with prototypical neuropathology. The symptoms may diverge among people, but the most common presentation is an insidiously worsening capability to recall new data. Neuropsychiatric issues, such as changes in mood and personality, may evolve over time. The severity of this deterioration varies from person to person. The most significant risk factor for Alzheimer's disease is age. Since a genetic mutation in the amyloid precursor proteins is extremely unlikely (less than 1%), variations in the APOE-e4 gene are seen in 40 percent to 65 percent of patients with Alzheimer's disease.

A family history of MCI, previous MCI, cardiovascular disease risk factors, education level, social and cognitive activity, and traumatic brain injury are all additional risk factors. The diagnosis is primarily clinical, and the patient's primary care physician is usually involved. A comprehensive medical, family, and neuropsychiatric history is important. To rule out other causes of dementia, regular lab tests as well as neuroimaging with magnetic resonance imaging (MRI) should be included in the routine workup. Neuropsychological tests and biomarker serologies [21] may be used to confirm the diagnosis if appropriate. Biomarkers that are currently being studied can be obtained from serum or Cerebral Spinal Fluid [2]. With sensitivity and specificity of 85 percent to 90 percent, the diagnostic accuracy of core CSF biomarkers is high.

B. *Symptoms of Alzheimer disease*

These are some of the common symptoms [12],[14] of AD, but not everyone experiences all of them. The following signs and symptoms may be present: Problems with familiar tasks, language problems, uncertainty about time and place, bad judgement, problems with abstract thinking, misplacing objects, changes in mood or actions, personality changes, lack of motivation to do things, loss of memory. This includes people the individual is familiar with, such as a child or spouse. Alzheimer's disease symptoms may resemble those of other illnesses or problems. Always seek medical advice from a trained physician.

C. *Alzheimer disease diagnosis*

There is no single test that can detect Alzheimer's disease [3],[12]. It is critical to determine whether the dementia is caused by a treatable illness. A healthcare provider will conduct a thorough examination of the patient's nervous system. The service worker can perform other tasks:

Full medical records: This will concern around your general wellbeing as well as previous health issues. The provider may evaluate the person's ability to handle everyday tasks.

 DOI : 10.35291/2454-9150.2021.0598

Brain imaging tests: No standard out other potential reasons for the issue, a CT scan, an MRI, or a PET scan can be used.

Mental status test: Memory, attentiveness, verbal, counting, and problem-solving test might be included. Neuropsychological evaluations are also possible. This will probably be a progression of evaluations to survey your psychological capacity [3]. Typically, this contains completing tasks & answering questions.

Additional laboratory examinations: Urine and blood checks can be used to identify the source of the problem.

D. Genetics

Many Alzheimer's patients have the late-onset form of the disorder, which manifests symptoms in their mid-60s. The apolipoprotein E (APOE) gene[4],[12]is tangled in late-onset Alzheimer's disease, gene comes in a variety of forms. One of them, APOE e4, builds an individual's danger of building up the infection and is identified with sickness beginning at a more youthful age. Carrying the APOE e4 gene variant, on the other hand, does not guarantee that an individual will develop Alzheimer's disease, and some people who do not have APOE e4 may develop the disease as well. Scientists are discovered as a set of attention-getting sections in the genome that might influence a individual's risk of Alzheimer's disease to changeable degrees. Alzheimer's disease affects individuals between the ages of 35 and 60, accounting for fewer than 5% of all cases. The majority of cases are triggered by an inherited alteration in one of 3 genes, resulting in a form of initial Alzheimer's disease. Others' disease continues to evolve without a specific, established cause, similar to how late-onset disease manifests. Since people with down syndrome may have an extra copy of chromosome 21, which contains the gene that produces destructive amyloid, Alzheimer's disease affects a large number of people with down syndrome.

E. Neurophysiology

Neurophysiology is a branch of physiology that studies the nervous system's functions. I.e., Neurons, glia, and networks are studied for their functional properties. As a result, much work and study has gone into getting a deeper understanding of the physiology of the ageing brain. The vascular physiology, hippocampal volumes, and neurogenesis where three areas of the brain where isometrics can have an impact. Age has a detrimental effect on brain blood flow, which is related to cognition. Moderate-intensity exercise has been shown to increase blood flow to the brain in a short amount of time. Exercise-trained men have higher cerebral blood flow than sedentary men, according to research. The new dementia and Alzheimer's disease rules [5] introduced in the 1980s enhanced clinical diagnosis reliability and enabled community trials of moderately demented patients to be conducted with a fair degree of accuracy. Many of these experiments used cognitive science theories and techniques to examine the cognitive effects of Alzheimer's sickness. These revisions used this tool to describe the component cognitive mechanisms underlying the neuropsychological deficits seen in Alzheimer's disease, and they demonstrated that cognitive changes induced by AD and other dementing disorders could have substantial consequences for current theories of brain–behavior relationships that underpin normal cognition.

Clinical neurophysiology is in a phase of rapid change, involving major alterations in its role in neurological research. Its clinical applications have scarcely changed in a generation, and there is a danger that much of contemporary clinical neurophysiology will rapidly become obsolete. Nonetheless, there is a major unmet need in measurement of clinical change, a role that requires the use of methods with very low intrinsic variance. The potential tide of change is well exemplified by the needs of clinicians in managing ALS, and other motor neuron disorders. As more reliable methods are developed or old methods are refined to allow replication with small variances between repeated observations, the standard methods are likely to be used more and more for measurement rather than diagnosis. In the context of motor neuron diseases, in which an inexorably progressive but slow decline in function is the norm, serial measures will enable future therapies to be controlled and assessed, probably more accurately than could simple clinical observations alone. Many conventional clinical neurophysiological techniques and MUNE (Daube, 1995) are well suited to this purpose.

III. SYMPTOMS OF ALZHEIMER'S DISEASE VS COMMON AGE-RELATED CHANGES

Table 2: Symptoms of Alzheimer's Disease Vs Common Age-Related Changes [23],[24]

Sl.No.	Symptoms of Alzheimer's disease or other forms of dementia	Common Age-Related Changes
1	Memory loss that causes problems in everyday life: One of the most common symptoms for Alzheimer's disease is memory loss, especially when it comes to forgetting newly acquired information.	A habit of forgetting names and appointments and then recalling them later.
2	Changes in one's ability to plan and execute a strategy, as well as their ability to deal with numbers: Certain people's ability to prepare	Doing a few mistakes when juggling a chequebook.

 DOI : 10.35291/2454-9150.2021.0598

	and execute a plan, as well as their ability to deal with numbers, deteriorates. They can find it difficult to focus and complete tasks much more slowly than before.	
3	Performing routine tasks at homebased, work, or vacation: People with Alzheimer's disease have a hard time doing simple tasks.	Occasionally requiring assistance to operate a microwave or record a television programme.
4	Time and location confusion.	trouble finding out what day of the week it is, so I'll work it out later.
5	Visual representations and spatial relationships are difficult to grasp.	Cataracts, glaucoma, and age-related macular degeneration may all because vision changes.
6	Misplacing objects and being unable to retrace the steps	Prone to misplacing items and having to retrace my steps to find them.
7	Changes in judgement or decision-making: Changes in judgement or decision-making can occur in people with Alzheimer's disease.	Giving a wrong decision every now and then.
8	Mood and personality changes: Alzheimer's patients' moods and personalities will shift. As a result of their experiences, they could become perplexed, suspicious, depressed, afraid, or anxious.	When a routine is broken, people develop very complex habits and become irritable.

IV. Management Of Alzheimer Disease

Treatment aims to improve the patient's capacity to function in daily situations, improve value of life, postpone the onset of symptoms [1], and control depression or unhealthy behaviours. Alzheimer's disease therapy is carried out in a standardised way. First and foremost, any medical problems that exacerbate Alzheimer's symptoms [17],[18] must be treated. Medications that aggravate AD, such as alcohol, sedatives, and antihistamines, must be detected and eliminated, or alternative medications must be substituted. Finally, any recovery plan for Alzheimer's disease must include "caring for the caregiver." Caregivers face a high risk of depression and medical illness, according to experts in this area. As a result, guidelines and guidance on community services and assistance have been introduced into the disease's overall management.

A. Pharmacological treatment for Alzheimer's disease

The latest pharmacologic treatment for Alzheimer's disease only offers temporary relief for six to eighteen months. 21 Cholinesterase inhibitors and memantine are the only drugs licenced for short-term relief of symptoms in the United States and many parts of Europe. These drugs have no effect on the pathology of Alzheimer's disease, but they enable the brain to compensate for the loss of neurons that communicate through the neurotransmitter acetylcholine. This fragment investigates the clinical adequacy of affirmed and conceivably fruitful pharmacological medicines for Alzheimer's sickness [20].

B. Non-cognitive symptom control in psychiatry

Although a significant feature of AD, there are a variety of treatments available, several of which have problems and difficulties for AD patients. Dementia's non-cognitive symptoms appear to change over time, so frequent evaluation allows treatment plans to be tailored to the individual's current needs. For instance, among the conduct issues found in Alzheimer's sickness, sorrow is more common almost immediately, while fancies and fantasies are more pervasive later on. Huge sadness and other burdensome conditions, self-destructive ideation or conduct, mental trips, dreams, fomentation, fierce conduct, disinhibition, nervousness, detachment, and rest disturbances are among the social issues to be handled.

C. Disease Control's Biggest Issues and Obstacles

While a cure would be preferable, an intervention that reduces the risk of future disease, similar to how cardiovascular disease [1] is treated, is likely to be the first step. Clinicians and medical attendants are accused of really focusing on a maturing populace influenced by dementia, have expanded as future has expanded by 2050, for instance, there would be a 400 percent ascend in the number of inhabitants in North Americans matured 85 and more established, with 40% of them creating dementia. Clinicians really focusing on dementia patients face different troubles in treating Alzheimer's illness and different dementias. In up to 90% of dementia cases, mental and social issues are available.

Behavioral problems tend to come and go, peaking in the middle stages of Alzheimer's disease. Dementia treatment [22] is often challenging since it necessitates distinguishing and addressing a range of changing neuropsychiatric and behavioural issues. There must likewise be an equilibrium struck between forceful intercession and palliative consideration, just as proceeded with treatment versus drug withdrawal, and patient advantage versus parental figure trouble. Dementia treatment is confounded, and it is a critical general medical problem for the present and future.

V. New Therapeutics for Alzheimer's Disease in the Past & Present

Several clinical trials are currently underway, the study into potential interventions is moving rapidly. This segment contains details about some of the areas where Alzheimer's disease research is currently being conducted.

 DOI : 10.35291/2454-9150.2021.0598

The number of medications being developed for Alzheimer's disease has increased dramatically over the last five years. Future drugs in development are designed to reduce the development of the disease.

A. *Immunotherapy*

The particular mechanisms that cause Alzheimer's disease remain unclear, reducing future targets for successful immunization. Pharma firms have spent much of the last decade trying to target clearance of A from the brains of Alzheimer's patients by delivering anti-A antibodies (passive) or A antigens (active).

B. *Biomarkers*

A biomarker is a biological signature [5] that can be used to identify the presence of a pathological disorder. As per the Working Group on Molecular and Biochemical Indicators [1] of Alzheimer Disease's Consensus Report from 1998, ideal biomarkers for Alzheimer's infection ought to be: intelligent or delegate of AD pathology, dependable, easy to perform/investigate and also moderately modest. One acts as a stand-in for the disease, which necessitates near-perfect sensitivity and specificity. The other is a diagnostic aid that needs a high level of sensitivity and precision once again. Another issue in AD is that sensitivity and precision require a criterion to validate against.

Since clinical diagnosis is prone to misclassification and no norm exists, developing biomarkers for Alzheimer's disease is difficult. Detecting AD specific biomarkers is difficult due to the long time between disease onset and symptomatic stage, the difficulty of precise clinical diagnosis, and complex genetic polymorphism. The discovery of new biomarkers for Alzheimer's disease would have a major effect on our understanding of the disease. New biomarkers can make it easier to classify people who are at risk for disease, as well as characterise subpopulations for disease initiation, development, and outcome. These specific markers can make it easier to develop customised treatments for different stages of the disease. Again, the most promising hopes for these new biomarkers are that they will target molecules that researchers will use to create drugs and vaccines for people who are at risk. Biomarkers may likewise be utilized for high-throughput screening of applicant atoms like dynamic mixtures, antibodies, or qualities that may trigger a particular biomolecular pathway connected to Alzheimer's infection [19]. Late outcomes, then again, demonstrate that biomarkers have incredibly restricted utility for Go/No Go choices in beginning phases of clinical improvement in light of the fact that there is still no proof.

i. Imaging and radiological markers

Imaging markers and tracers would certainly assist in the production of more reliable diagnostics for Alzheimer's disease and the tracking of therapeutic results. These imaging techniques are also very costly, so they cannot be used to track disease progression on a regular basis in all countries. Updated and less costly alternatives, as in other areas of imaging and diagnostics, can be developed and researched.

ii. Biomarkers in cerebrospinal fluid

The cerebrospinal fluid (CSF) [8] biomarkers amyloid β (Aβ), total tau (T-tau) and phosphor tau (P-tau) will be Increasingly, it's being used to back up a clinical diagnosis of Alzheimer's disease. The diagnostic capacity of these biomarkers has been documented to vary depending on the results of different studies.

iii. Biomarkers in blood and plasma

Blood and plasma markers face many obstacles, some of which are technological in nature and others which are related to blood-brain barrier problems. Since blood does not come into direct contact with the brain, blood-based biomarkers pose a significant challenge. As a consequence, proteins and metabolites that originate in the brain and cross the blood-brain barrier are significantly diluted in blood and plasma, both of which are complex mediums. The rate of exchange across the blood-brain barrier is also influenced by particle size. There are already high expectations for the identification of new Alzheimer's disease biomarkers [1] in blood and plasma. The advantages of using blood and plasma markers are clear: they are inexpensive and easy to obtain from patients. Blood remains a confounded substance encompassed of proteins, lipids, and metabolites, just as different cell types like red cells, platelets, and lymphocytes, whose arrangement changes relying upon the interior and outside setting.

VI. CONCLUSION:

The most frequent cause of dementia is Alzheimer's disease, which is on the rise around the world and treatment of Alzheimer's disease (AD) should be started as soon as possible. This necessitates early and accurate diagnosis. The diagnosis for AD can be made with great precision using neuropsychological, imaging, and spinal fluid tests. Complementary tests to diagnose the disease have been refined by scientific studies. The initial investigation of the disorder is also based on a positive family history and an early clinical assessment. New biomedical research is being undertaken in order to provide this community of patients with more timely diagnosis and care. New studies covering a greater number of patients and testing nonpharmacological treatments would assist in deciding which alternative therapies are genuinely efficient. Nonpharmacological care should be

 DOI : 10.35291/2454-9150.2021.0598

personalised to the individual needs of each patient, with an emphasis on their convenience, in order to maximise health outcomes. As a result, we anticipate that new studies into the pathophysiology, diagnosis, and management of the condition will lead to improved quality of life, halting neurodegeneration, and perhaps even a therapeutic solution in the future.

REFERENCES

[1] www.who.int
[2] journals.lww.com
[3] www.urmc.rochester.edu
[4] www.nia.nih.gov
[5] Alzheimer's Association. Alzheimer's Disease Facts and Figures.Alzheimers *Dement* 2018;14(3):367-429
[6] alz.org/stages
[7] ALZHE IMER'S Assoc IAT ION Report.: 2020 *Alzheimer's disease facts and figures*,2020. Pp. 1-70. DOI: 10.1002/alz.12068.
[8] Diane Slats, Petra E. Spies, Magnus J.C. Sjögren, Frans R.J. Verhey, Marcel M. Verbeek,MarcelG.M. Olde Rikkert. "Cerebrospinal Fluid Biomarkers in Diagnosing Alzheimer's Disease in Clinical Practice: An Illustration with 3 Case Reports", *Case Reports in Neurology*, 2010.
[9] Zhenquan Xuan, Xingmei Gu, Sicheng Yan, Yanfei Xie et al. "Dimeric Tacrine (10)-Hupyridone Effectively Combats Alzheimer's Disease as A Multi-Target-Directed Ligand", Research *Square*, 2021
[10] Weller J and Budson A. Current understanding of Alzheimer's disease diagnosis and treatment. F1000Research 2018, 7(F1000 Faculty Rev):1161 (https://doi.org/10.12688/f1000research.14506.1)
[11] Konrad Maurer, Stephan Volk, Hector Gerbaldo," Auguste D and Alzheimer's disease", *Lancet* 1997; 349:1546–49.
[12] https://www.alzsd.org/wp-content/uploads/2016/05/ALZHEIMERS-Understanding-the- disease.pdf
[13] Saloni Tanna, "Alzheimer Disease and other Dementias", on 2004 *Background Paper, BP 6.11 Alzheimer Disease.*
[14] Bature F, Guinn B, Pang D, et al. Signs and symptoms preceding the diagnosis of Alzheimer's disease: a systematic scoping review of literature from 1937 to 2016. *BMJ Open*2017;7: e015746. doi:10.1136/bmjopen-2016-015746
[15] https://medicine.umich.edu/dept/mneuronet/news/archive/201907/early-alzheimer%E2%80%99s-disease-detection-may-benefit-new-stem-cell-therapy
[16] Crous-Bou et al. Alzheimer's Research & Therapy (2017) 9:71 DOI 10.1186/s13195-017-0297-z
[17] International, A.s.D. The global impact of dementia: an analysis of pervalence, incidence, cost and trends, in World Alzheimer Report. London: International, A.s.D; 2015.
[18] Takizawa C, et al. Epidemiological and economic burden of Alzheimer's disease: a systematic literature review of data across Europe and the United States of America. J Alzheimers Dis. 2015;43(4):1271–84.
[19] Dubois B, et al. Preclinical Alzheimer's disease: definition, natural history, and diagnostic criteria. Alzheimers Dement. 2016;12(3):292–323.
[20] Giacobini E, Gold G. Alzheimer disease therapy—moving from amyloid-beta to tau. Nat Rev Neurol. 2013;9(12):677–86.
[21] Weller J and Budson A. Current understanding of Alzheimer's disease diagnosis and treatment [version 1; peer review: 2approved] F1000Research 2018, 7(F1000 Faculty Rev):1161 (https://doi.org/10.12688/f1000research.14506.1)
[22] Meredith N. Braskie, Neda Jahanshad, Jason L. Stein, Marina Barysheva, Katie L. McMahon, Greig I. de Zubicaray, Nicholas G. Martin, Margaret J. Wright, John M. Ringman, Arthur W. Toga and Paul M. Thompson" Common Alzheimer's Disease Risk Variant Within the *CLU* Gene Affects White Matter Microstructure in Young Adults" *Journal of Neuroscience 4May*2011, 31 (18) 67646770; DOI :https://doi.org/10.1523/JNEUROSCI.5794-10.2011
[23] Bondi, M., Edmonds, E., & Salmon, D. (2017). Alzheimer's Disease: Past, Present, and Future. *Journal of the International Neuropsychological Society*, 23(9-10), 818-831. doi:10.1017/S135561771700100X.
[24] Ringman, John & Liang, Li-Jung & Zhou, Yan & Vangala, Sitaram & Teng, Edmond & Kremen, Sarah & Wharton, David & Goate, Alison & Marcus, Daniel & Farlow, Martin & Ghetti, Bernardino & Mcdade, Eric & Masters, Colin & Mayeux, Richard & Rossor, Martin & Salloway, Stephen & Schofield, Peter & Cummings, Jeffrey & Buckles, Virginia & Morris, John. (2015). Early behavioural changes in familial Alzheimer's disease in the Dominantly Inherited Alzheimer Network. Brain: *a journal of neurology*. 138. 10.1093/brain/awv004.
[25] Korolev IO. Alzheimer's Disease: A Clinical and Basic Science Review. *Medical Student Research Journal*. 2014;4(Fall):24-33

 DOI : 10.35291/2454-9150.2021.0598