Bioscience Biotechnology Research Communications Vol 15 No (1) Jan-Feb-March 2022 P-ISSN: 0974-6455 E-ISSN: 2321-4007

## **Medical Communication**

# Alzheimer's Disease Current and Future Perspectives: A Review

#### Ashwaq Hassan Batawi

Department of Biological Science, Faculty of Science, King Abdulaziz University Jeddah, Saudi Arabia

#### ABSTRACT

Alzheimer's disease is a destructive sickness having a devastating impact on the life of people diagnosed with the disease and their loved ones. Dementia is the source of Alzheimer's disease (AD) and the most striking side effect is cognitive decline, particularly the loss of late learned data. As the ailment advances, the individual may likewise encounter changes in character and conduct, for example, tension, dubiousness, or tumult. Alzheimer's is a developing issue of the nervous system, where 15% of individuals over age 65 are influenced, and 40% of those over age 85 get it. Alzheimer's sickness can happen in more youthful individuals too. Exploration has additionally indicated that viable consideration and backing can improve the personal satisfaction of the patients and their parental information. The present review compiles the work of researchers who have gained astounding ground in seeing how Alzheimer's sickness influences the body and the mind. Their bits of knowledge highlight promising new medicines to slow or stop the dreadful afflictions of the mind. In spite of the fact that getting more established is the greatest hazard factor for dementia, proof shows there are things one can adapt to decrease the hazards. These incorporate keeping dynamic and stable state of mind, eating soundly, and practicing control of the psyche. Taking to exercises, and healthy food, avoiding smoking and alcohol, being physically active with a regimen of mind exercises and a sound body can greatly help to control and prevent the onset of the disease..

**KEY WORDS:** ALZHEIMER, DISEASE, DEMENTIA, CONTINUUM, BIOMARKERS, HEALTH CARE.

# **INTRODUCTION**

In 1901, Dr Alzheimer describes a case study of a 51-year-old patient, called Auguste Deter suffering from extraordinary behavioral symptoms like short-term memory loss and he tried to study her brain structure after her death. Age-related mental disintegration as an element had been perceived for all intents and purposes for written history. Throughout the following century, Alzheimer's illness has become the focal point of one of the most concentrated examinations in clinical history (Boller et al., 2007; Snyder and Pearn, 2007; Daroff, 2020).

Alzheimer's was met with quietness when it originally introduced the case of " an unmistakable ailment process". With a couple of special cases and for a few reasons, "Alzheimer's ailment" for generally the following 50 years meant "presenile" dementia and contrasted from the "typical" feebleness related with mature age, regardless of Alzheimer's declaration that there were no noteworthy neurotic contrasts among more established and more youthful cases. This sickness is "an unconventional malady process that is to a

Article Information:\*Corresponding Author: abatawi@kau.edu.sa Received 10/11/2021 Accepted after revision 15/03/2022 Published: 31<sup>st</sup> March 2022 Pp-03-11 This is an open access article under Creative Commons License, https://creativecommons.org/licenses/by/4.0/. Available at: https://bbrc.in/ DOI: http://dx.doi.org/10.21786/bbrc/15.1.1 great extent autonomous old enough". Alzheimer portrayed now recognizable unmistakable pathology and slides from two patients were rediscovered in 1992 and 1997obviously exhibit various trademark cortical plaques and tangles (Graeber, 2006; Nair and Green, 2006; Bekris et al., 2010; Daroff, 2020).

Transformations of the qualities bring about the creation of irregular proteins that are related to the sickness. Every one of the transformations assumes the job in the breakdown of APP, these proteins exact capacity isn't yet completely comprehended. This breakdown is a piece of a procedure that produces unsafe types of amyloid plaques, a sign of Alzheimer's infection (Bekris et al., 2010).

Late-Onset: A considerable number of individuals with late-starting of Alzheimer's, signs become evident in their mid-60s and later. Scientists discovered particular quality that legitimately for late-beginning AD, ailment. Notwithstanding having hereditary variation for the Apo lipoprotein E (APOE) quality on chromosome 19 builds an individual's hazard. The APOE quality is engaged with making a protein that helps convey cholesterol and different sorts of fat in the circulatory system. APOE had few distinct structures or alleles where every individual acquires two APOE alleles, one from every characteristic parent. APOE



ε2 is moderately uncommon and may give some assurance against the illness.

In the event that Alzheimer's sickness happens in an individual with this allele, it for the most part grows sometimes down the road than it would in somebody with the APOE  $\varepsilon$ 4 quality. APOE  $\varepsilon$ 3, the most well-known allele, is accepted to assume an unbiased job in the sickness—neither diminishing nor expanding hazard while APOE  $\varepsilon$ 4 expands the chance for Alzheimer's ailment and is likewise connected with a prior time of ailment beginning. Having a couple APOE  $\varepsilon$ 4 alleles expands the danger of creating Alzheimer's. Around 25 percent of individuals convey one duplicate of APOE  $\varepsilon$ 4, and 2 to 3 percent convey two duplicates (Bekris et al., 2010, Escott-Price and Schmidt, 2021).

Moreover, APOE  $\varepsilon$ 4 is known as a hazard factor quality since it expands an individual's danger of building up the malady. In any case, acquiring an APOE  $\varepsilon$ 4 allele doesn't imply that an individual will create Alzheimer's. A few people with an APOE  $\varepsilon$ 4 allele never get the infection, and other people who build up Alzheimer's don't have any APOE  $\varepsilon$ 4 alleles. Also, progressing assessment shows that unprecedented kinds of the APOE allele may give protection against Alzheimer's affliction. More examinations are required to choose how these assortments may delay infection starting or lower a person's peril (Bekris et al., 2010, Van Cauwenberghe et al., 2016, Escott-Price and Schmidt, 2021).

Effects of Human Health, Environment, and Lifestyle on Alzheimer's symptoms: Examination recommends that a large group of components past hereditary qualities may assume a job in the turn of events and course of Alzheimer's ailment. There is a lot of enthusiasm, for instance, in the connection between intellectual decay and vascular conditions, for example, coronary illness, stroke, and hypertension, just as metabolic conditions, for example, diabetes and corpulence. Progressing exploration will assist us with getting whether and how decreasing danger factors for these conditions may likewise diminish the danger of Alzheimer's (Monterey et al., 2021). A nutritious eating regimen, physical action, social commitment, and intellectually animating interests have all been related with helping individuals remain solid as they age. These components may likewise help diminish the danger of intellectual decay and Alzheimer's infection. Clinical preliminaries are trying a portion of these conceivable outcomes (Reveglia et al., 2021).

**Symptoms and Signs:** Memory issues are regularly one of the primary indications of intellectual impedance identified with Alzheimer's ailment. A few people with memory issues have a condition called mellow intellectual weakness (MCI). In MCI, individuals have more memory issues than typical for their age however, their side effects don't meddle with their regular day-to-day existences. Development challenges and issues with the feeling of smell have likewise been connected to MCI. More established individuals with MCI are at more serious hazard for treating Alzheimer's, yet not every one of them do. Some may even return to typical cognizance (Ames et al., 2010).

The principal manifestations of Alzheimer's fluctuate from individual to individual. For some, a decrease in non-memory parts of discernment, for example, worddiscovering, vision/spatial issues, and weakened thinking or judgment, may flag the beginning phases of Alzheimer's illness. Scientists are contemplating biomarkers (natural indications of sickness found in cerebrum pictures, cerebrospinal liquid, and blood) to identify early changes in the minds of individuals with MCI and in intellectually typical individuals who might be a more serious hazard for Alzheimer's. Studies show that such early recognition is conceivable, however, more exploration is required before these procedures can be utilized routinely to analyze Alzheimer's sickness in ordinary clinical practice (Bai et al., 2021).

Loss of memory is one of the most widely recognized early indications of dementia is overlooked as of late learned data. In any case, individuals with Alzheimer's infection overlook such things all the more regularly and don't recollect them later. Individuals with Alzheimer's regularly think that it's difficult to finish ordinary undertakings that don't for the most part require a lot of thought. For instance, an individual who was consistently a decent cook and taken care of dinners will most likely be unable to follow a formula or may consume a dish she used to plan without any problem. Individuals with Alzheimer's have problems with language. Everybody experiences difficulty finding the correct word on occasion, yet individuals with Alzheimer's ailment may overlook even normal words like "toothbrush. They may then substitute a surprising word or expression, which can make their language difficult to understand. In the event that an individual with Alzheimer's sickness is feeling the loss of his toothbrush, he may request "that thing for my mouth (Kempler and Goral, 2008).

Individuals with Alzheimer's sickness can get lost even in their own neighborhoods. They likewise may overlook where they are and how they arrived, and may not realize how to get back home. They may think it is 1996, rather than 2006, or that they are 47, not 87 years of age. Nobody has flawless judgment constantly. Be that as it may, individuals with Alzheimer's may dress improperly, wearing a few shirts on a warm day or next to no attire on a cool day. They may likewise show misguided thinking about cash, parting with huge totals to outsiders or by requesting items that they needn't bother with. They have problems with good thinking however an individual with Alzheimer's ailment may overlook what the numbers mean and how to manage them. They have problems with Hiding things or misplacing. They can lose a wallet or a key and they can put the iron in the cooler or a wristwatch in the sugar bowl (Cerejeira et al., 2012, Tanaka et al., 2015; Kracht et al., 2021).

Alzheimer's patients have strong behavioral changes in mood. We would all be able to get dismal or cranky. An individual with Alzheimer's sickness may show quick emotional episodes, changing from quiet to tears to outrage, for no obvious explanation. Different personality changes were recorded for individuals with Alzheimer's. Characters may change fairly after some time. Be that as it may, an individual with Alzheimer's can have exceptional character changes, getting dubious, dreadful, or uncommonly reliant on a relative (Cerejeira et al., 2012; Feast et al., 2016; Matsuoka et al., 2019; Kracht et al. 2021).

It's entirely expected to feel burnt out on housework, business exercises, or social commitments. Individuals with Alzheimer's infection may turn out to be inactive, sitting before the TV for quite a long time, resting more than expected, or not having any desire to take an interest in their standard exercises. In the event that you perceive any of these notice signs in yourself or those in your family, you should converse with your primary care physician or urge them to make reference to these manifestations to their PCP. Early finding is a significant advance to getting fitting treatment, care, and backing (van Duinen-van den Ijssel et al., 2017, Kracht et al. 2021).

Pathophysiology and Neuropathology: Histopathologic picture of feeble plaques found that cerebral cortex of Alzheimer's individual ailment the presentile beginning. Illness of Alzheimer described as neurons loss and neurotransmitters in certain subcortical districts and cerebral cortex. Misfortune brings about decay gross in the influenced districts, remembering degeneration for the fleeting projection and parietal flap, and parts of the frontal cortex and cingulate gyrus. Degeneration is likewise present in brainstem cores like the locus coeruleus. Studies utilizing PET and MRI have reported decreases in the size of explicit cerebrum areas in individuals with AD as they advanced from gentle psychological disability to Alzheimer's sickness, and in correlation with comparable pictures from sound more seasoned adults (Wenk, 2003; Desikan et al., 2009; Braak et al., 2012).

Both neurofibrillary tangles and amyloid plaques are plainly noticeable with microscopic observation in minds of those tormented by the disease. Thick Plaques, for the most part, are insoluble stores of beta-amyloid peptide and cell outside material and neurons around. Tangles (neurofibrillary tangles) are totals of the microtubule-related protein tau which has become hyperphosphorylated and aggregate inside the cells themselves. Albeit numerous more established people build up certain plaques and tangles as a result of maturing, individuals' minds with the disease have a more noteworthy number of them in explicit cerebrum locales, for example, the worldly lobe. Lewy bodies are not uncommon in the minds of disease individuals (Bouras et al.,1994; Kotzbauer et al., 2001; Tiraboschi et al., 2004; Kracht et al., 2021).

**Biochemistry:** Alzheimer's malady has been distinguished as a protein misfolding sickness (proteopathy), brought about by plaque collection of anomalous collapsed amyloid beta protein and tau protein in the brain. Plaques are comprised of little peptides, 39–43 amino acids long, called amyloidbeta (A $\beta$ ). A $\beta$  is apart from the bigger amyloid antecedent protein (APP). Application is a transmembrane protein that infiltrates through the neuron's film. Application is basic to neuron development, endurance, and post-injury repair. In Alzheimer's infection, gamma-secretase and beta-secretase act together in a proteolytic procedure which causes APP to be separated into littler fragments. One of these parts offers to ascend to fibrils of amyloid-beta, which at that point structure bunches that store outside neurons in thick arrangements known as feeble plaques (Turner et al., 2003; Hashimoto et al., 2003; Tiraboschi et al., 2004; Ohnishi et al., 2004; Hooper., 2005; Priller et al., 2006).

Advertisement is additionally viewed as a tauopathy because of the unusual collection of the tau protein. Each neuron has a cytoskeleton, an interior help structure mostly comprised of structures called microtubules. These microtubules' demonstration is like tracks, directing supplements and particles from the body of the cell to the closures of the axon and back. A protein called tau balances out the microtubule-related protein. In AD, tau experiences substance changes, turning out to be hyperphosphorylated; it at that point starts to combine with different strings, making neurofibrillary tangles and crumbling the neuron's vehicle system. Pathogenic tau can likewise cause neuronal demise through transposable component dysregulation (Hernández et al., 2007; Sun et al., 2018).

**Mechanism of Disease:** Precisely how unsettling influences of creation and conglomeration of the beta-amyloid peptide offer ascent to the pathology of AD isn't known. The amyloid theory generally focuses to the gathering of betaamyloid peptides as the focal occasion setting off neuron degeneration. Amassing of collected amyloid fibrils, which are accepted to be the poisonous type of the protein liable for disturbing the cell's calcium particle homeostasis and prompts modified cell apoptosis (Yankner et al., 1990; Van et al., 2007; Huang et al., 2012; Hosseinian et al., 2020).

It is additionally realized that  $A\beta$  specifically develops in the mitochondria in the phones of Alzheimer's-influenced minds, and it likewise represses certain compound capacities and the use of glucose by neurons. Different incendiary procedures and cytokines may likewise have a job in the pathology of Alzheimer's illness. Aggravation is an overall marker of tissue harm in any infection and might be either optional to tissue harm in AD or a marker of immunological response. There is expanding proof of a solid collaboration between the neurons and the immunological systems in the cerebrum. Stoutness and fundamental aggravation may meddle with immunological procedures which advance ailment progression. Changes in the dispersion of various neurotrophic factors and in the declaration of their receptors, for example, the cerebrum inferred neurotrophic factor have been depicted in AD (Greig et al., 2004; Chen et al., 2006; Arancibia et al., 2008, Schindowski et al., 2008, Heneka et al., 2015; FDA, 2021).

**Prevention of Alzheimer's disease:** There is no authoritative affirmation to help that a specific measurement is powerful in forestalling this disease. International assessments for measurement of ruin and defer the beginning of the disease that has routinely passed on conflicting outcomes. Epidemiological evaluations proposed a relationship

between modifiable components, for example, diet, pharmaceutical things, cardiovascular hazard and scholarly exercises between others, masses' probability for growing this disease. Just more evaluation, as clinical preliminaries, will uncover these parts to help with ruining the disease (Marshall, 2017; Monterey et al., 2021).

**Medication for Alzheimer's disease:** Risk factors, including hypertension, smoking, diabetes, and hypercholesterolemia, are related as higher danger for beginning and declined AD. Drugs for blood pressure diminish the risk and Statins may lower cholesterol be as it may not compelling for forestalling and improving the disease. Statins don't give off an impression of being valued as a treatment, yet starting in 2011 were believed to be up-and-comers like prevention of presymptomatic. Substitution of hormone treatment in menopause, albeit recently utilized, may build the danger of dementia (Rosendorff et al., 2007; Reiss et al., 2007; Kuller, 2007; Patterson et al., 2008; Hoozemans et al., 2011; Guinness et al., 2014; Hsu et al., 2017; Marjoribanks et al., 2017; Hsu et al., 2017; Ding et al., 2019; Monterey et al., 2021).

**Diet and Lifestyle:** Individuals keep up solid, the Mediterranean and Japanese eating routine have a diminished danger of this disease. Mediterranean eating regimen improves results in those with the disease. People are eating routines high in immersed fats and basic starches (mono-and disaccharide) have a higher risk. The Mediterranean eating routine's useful cardiovascular impact has been proposed as the component of action. Ends on dietary segments have on occasion been hard to learn as results have contrasted between populace-based investigations and randomized controlled trials. There is constrained proof that light to direct utilization of liquor, especially red wine, is related to a lower danger of AD. There is speculative proof that caffeine might be protective.

Various nourishments high in flavonoids, for example, cocoa, red wine, and tea may diminish the danger of AD. Science 2010, Curcumin started to demonstrate an advantage for individuals despite the fact that there is conditional proof in animals. Unconvincing and conflicting proof that the beneficial of ginkgo outcome on dementia and psychological impedance. No solid proof for cannabinoids has compelling for improving indications of Alzheimer's disease (Solfrizzi et al., 2008; Krishnan et al., 2009; Birks and Grimley, 2009; Hamaguchi et al., 2010; Stoclet and Schini-Kerth, 2011; Bilkei et al., 2012; Gupta et al., 2013; Tan et al., 2021).

People who partake in academic activities, for instance, scrutinizing, playing table games, completing crossword puzzles, playing instruments or ordinary social collaboration show a reduced peril for Alzheimer's disease. This is acceptable with the scholarly spare speculation, which communicates that some useful experiences achieve more capable neural working giving the individual a mental spare that concedes the start of dementia manifestations. Education delays the start of AD issues without changing the term of the disease. Learning a resulting language, a lot further not far off seems to defer the start of Alzheimer's disease. Physical activity is moreover associated with a diminished threat of AD. Physical exercise is connected with the decreased pace of dementia. Physical exercise is furthermore feasible in diminishing sign earnestness in those with Alzheimer's disease (Stern, 2006; Paradise et al., 2009; Farina et al., 2014; Cheng, 2016; Monterey et al., 2021).

#### **Treatment of Alzheimer:**

**Non-pharmacologic therapy:** Nonpharmacologic methods are identified as ways that do not use any medication but depend on computerized memory training, listening to favorite music as a way to stir recall, and using special lighting to lessen sleep disorders. These methods are suitable for patients with Alzheimer's dementia to maintain or improve cognitive function, life quality, and/or human performance and daily activities. The goal of these methods is to reduce the bad behaviors and disease symptoms like sadness, apathy, wandering, sleep instability, disturbance and violent behavior. It is clear that non-pharmacologic interventions (Watt et al., 2019).

Fatefully, in some cases, they do not stop the damage and destruction of neurons that cause Alzheimer's symptoms and make the disease fatal. Measuring the activities of these treatments is not easy because of the huge numbers of the tested therapies. Aguirre et al. (2013) detected that cognitive motivation had useful actions on cognitive performance in people with Alzheimer's dementia while the results of Farina et al. (2014) detected an excellent activity of exercise on the cognitive function which slow down the decline rate of cognitive in people with Alzheimer's dementia. Groot et al. (2016) established that aerobic training and exercise are helpful on cognitive function in Alzheimer's dementia patients. Similarly, Fukushima (2016) reported that cognitive motivation was connected with the improved levels of depression in Alzheimer's dementia patients with moderate symptoms. Cognitive stimulation, music-based ways, and psychological treatment improved depression, anxiety, and quality of life in Alzheimer's patients (Bahar-Fuchs, 2019, Kishita, 2020).

**Pharmacologic treatment:** Alzheimer's is a temporary, progressive brain disorder that gradually decreases memory and skills of thinking, and in the end, the capability to do simple tasks. Alzheimer's disease-specific causes are not well known. Many changes in the brain are noticed including amyloid plaques and neurofibrillary due to loss of neurons and their connections which affect the abilities of the person to think or remember. Since 2003, Aduhelm was the first treatment approved for Alzheimer's disease due to the reduction of amyloid-beta plaque in the brain. The used drug to treat Alzheimer's was summarized in Table 1. FDA-affirmed medicines for Alzheimer's while there is no solution for Alzheimer's infection (FDA, 2021).

About 3 of the 5 accessible prescriptions donepezil, galantamine, and rivastigmine are from a class of medications called "cholinesterase inhibitors." These medications forestall the breakdown of a concoction courier in the cerebrum that is significant for learning and

memory. The fourth medication, memantine, manages the action of an alternate concoction courier in the cerebrum that is likewise significant for learning and memory. The two sorts of medications help oversee side effects yet work in various manners. The fifth medicine is a mix of one of the cholinesterase inhibitors (donepezil) with memantine. Understanding accessible treatment alternatives can help people living with the ailment and their parental figures to adapt to side effects and improve personal satisfaction for a period.

Cholinesterase inhibitors are endorsed to treat side effects identified with memory, thinking, language, judgment, and other points of view. Three distinctive cholinesterase inhibitors are ordinarily endorsed: Donepezil (advertised under the brand name Aricept) is affirmed to treat all phases of Alzheimer's ailment. Galantamine (Razadyne), endorsed for gentle to-direct stages. Rivastigmine (Exelon) endorsed mellow to-direct Alzheimer's just as gentle to direct dementia-related with Parkinson's illness. The effectiveness of these drugs varies from person to person and no drugs are specifically approved for severe stages of Alzheimer's dementia by the FDA to improve behaviorally and remove symptoms (Bloudek et al., 2011, McKhann, 2012, Maust et al., 2015, Ralph and Espinet, 2018, FDA, 2021).

**Cholinesterase inhibitors:** Cholinesterase inhibitors work by expanding levels of acetylcholine, a substance courier associated with memory, judgment, and other manners of thinking. Certain synapses discharge acetylcholine, which conveys messages to different cells. After a message arrives at the getting cell, different synthetic compounds, including a catalyst called acetylcholinesterase, separate acetylcholine so it tends to be reused. Alzheimer's ailment harms or annihilates cells that produce and use acetylcholine, in this manner decreasing the sum accessible to convey messages (Anand and Singh, 2013).

A cholinesterase inhibitor eases back the breakdown of acetylcholine by obstructing the action of acetylcholinesterase. By keeping up acetylcholine levels, the medication may help make up for the loss of working synapses. Cholinesterase inhibitors appear to offer different advantages, also. For instance, galantamine seems to invigorate the arrival of acetylcholine and fortify the way certain message-accepting nerve cells react to it. Rivastigmine may obstruct the movement of another compound associated with separating acetylcholine. Cholinesterase inhibitors can't turn around Alzheimer's and won't stop the hidden demolition of nerve cells. Thus, their capacity to improve side effects in the long run decreases as synapse harm advances (Anand and Singh, 2013).

In clinical preliminaries of each of the three cholinesterase inhibitors, individuals taking the meds performed better on memory and thinking tests than those taking a fake treatment, or latent substance. Be that as it may, the level of progress was little. Regarding in general impact, cholinesterase inhibitors may defer or slow exacerbating of indications. The adequacy of cholinesterase inhibitors, just as how long they are viable, fluctuates from individual to individual. There is no proof that joining the three medications would be more useful than taking any of them. Truth be told, joining them would almost certainly bring about a more prominent recurrence of symptoms. There is some proof that people with moderate-to-severe Alzheimer's who are taking a cholinesterase inhibitor may profit by likewise taking memantine (Anand and Singh, 2013, FDA, 2021).

Table 1. The used drugs for treatment of Alzheimer's sickness and their side effects			
Drug	Brand	Approved For	Side Effects
Donepezil	Aricept®	All stages	Nausea, vomiting, loss of appetite, muscle cramps and increased frequency of bowel movements.
Galantamine	Razadyne®	Mild to moderate	Nausea, vomiting, loss of appetite and increased frequency of bowel movements.
Memantine	Namenda®	Moderate to severe	Headache, constipation, confusion and dizziness
Rivastigmine	Exelon®	Mild to moderate	Nausea, vomiting, loss of appetite and increased frequency of bowel movements.
Memantine+ Donepezil	Namzaric®	Moderate to severe	Nausea, vomiting, loss of appetite, increased frequency of bowel movements, headache, constipation, confusion and dizziness.

**Memantine:** Memantine (Namenda®) is recommended to improve memory, consideration, reason, language, and the capacity to perform basic errands. It was the principal Alzheimer's medication of the NMDA receptor opponent sort endorsed in the United States. It is utilized to get moderate serious Alzheimer's. The FDA declined to

endorse memantine for gentle Alzheimer's in 2005 (Jiang et al., 2015). Memantine seems to work by managing the movement of glutamate, a substance engaged with data preparing, stockpiling, and recovery. Glutamate assumes a basic job in memory and learning setting off NMDA receptors to give a calcium-controlled measurement for access to a nerve cell. Required calcium makes the concoction condition for data stockpiling.

Abundance glutamate, then again, overstimulates NMDA receptors with the goal that they permit an excessive amount of calcium into the nerve cells. That prompts disturbance and the passing of cells. Memantine may secure cells against an abundance of glutamate by somewhat blocking MNDA receptors (Jiang et al., 2015). Clinical examination demonstrated that individuals taking memantine indicated a little yet measurably noteworthy improvement in their psychological capacity and capacity to perform day-byday exercises. Be that as it may, study members with the most minimal psychological working indicated no enhancement for either day-by-day exercises or by and large capacity. Another examination haphazardly allotted members to get either 10 mg of memantine two times per day or a fake treatment notwithstanding donepezil (Aricept), a cholinesterase inhibitor. Those getting memantine demonstrated a factually noteworthy advantage in mental working and performing day-by-day exercises, while members taking donepezil in addition to fake treatment kept on declining.

# CONCLUSION

The review compiles the work of researchers who have gained astounding ground in seeing how Alzheimer's sickness influences the body and the mind. Their bits of knowledge highlight promising new medicines to slow or stop the dreadful afflictions of the mind. In spite of the fact that getting more established is the greatest hazard factor for dementia, proof shows there are things one can adapt to decrease the hazards. These incorporate keeping dynamic and stable state of mind, eating soundly, and practicing control of the psyche. Taking to exercises, and healthy food, avoiding smoking and alcohol, being physically active with a regimen of mind exercises and a sound body can help to a great extent control and prevent the onset of the disease.

Conflict of Interest: There is no Conflict of Ineterest

## Funding: Nill

**Data Availability Statement:** The database generated and/ or analysed during in the current study are not publicly available due to privacy and confidentiality agreements as well as other restriction but are available from the corresponding author on responsible requtest

Author Contributions: Ashwaq Hassan Batawi, was the study designer. He was involved in clinical and laboratory data collection and analysis of data. He was also participated in writing the manuscript.

## REFERENCES

Aguirre E, Woods RT, Spector A, Orrell M. (2013). Cognitive stimulation for dementia: A systematic review of the evidence of effectiveness from randomised controlled trials. Ageing Res Rev., 12(1):253-62.

Ames D, Chiu E, Lindesay J and Shulman K I. (2010). Guide to the Psychiatry of Old Age. Cambridge: Cambridge University Press.

Anand P and Singh, B (2013). A review on cholinesterase inhibitors for Alzheimer's disease. Arch. Pharm. Res., 36, 375–399.

Bahar-Fuchs A, Martyr A, Goh AMY, Sabates J, Clare L. (2019). Cognitive training for people with mild to moderate dementia. Cochrane Database of Systematic Reviews, Issue 3. Art. No.: CD013069.

Bai B, Vanderwall D, Li Y, Wang X, Poudel S, Wang H, Dey KK, Chen PC, Yang K, Peng J. (2021). Proteomic landscape of Alzheimer's Disease: novel insights into pathogenesis and biomarker discovery. Mol Neurodegener;16(1):55.

Bekris LM, Yu CE, Bird TD, Tsuang DW. (2010). Genetics of Alzheimer disease. J Geriatr Psychiatry Neurol.;23(4):213-227.

Bennett DA, Schneider JA, Arvanitakis Z, Kelly JF, Aggarwal NT, Shah RC et al. (2006). Neuropathology of older persons without cognitive impairment from two community-based studies. Neurology; 66:1837-44.

Bilkei-Gorzo A (2012). The endocannabinoid system in normal and pathological brain ageing. Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences, 367 (1607):3326–41.

Birks J, Grimley Evans J (2009). Ginkgo biloba for cognitive impairment and dementia. The Cochrane Database of Systematic Reviews (1): CD003120.

Bloudek LM, Spackman ED, Blankenburg M, Sullivan SD. (2011). Review andmeta-analysis of biomarkers and diagnostic imaging in Alzheimer's disease. J Alzheimers Dis; 26:627-45.

Bouras C, Hof PR, Giannakopoulos P, Michel JP, Morrison JH (1994). distribution of neurofibrillary tangles and senile plaques in the cerebral cortex of elderly patients: a quantitative evaluation of a one-year autopsy population from a geriatric hospital. (PDF). Cerebral Cortex. 4 (2): 138–50.

Braak H and Del Tredici K (2012). Where, when, and in what form does sporadic Alzheimer's disease begin? Current Opinion in Neurology. 25 (6): 708–14.

Burckhardt M, Herke M, Wustmann T, Watzke S, Langer G, Fink A (2016). Omega-3 fatty acids for the treatment of dementia. The Cochrane Database of Systematic Reviews. 4: CD009002.

Cerejeira J, Lagarto L, Mukaetova-Ladinska EB (2012). Behavioral and psychological symptoms of dementia.

#### Front Neurol., 3:73.

Chen X, Yan SD (2006). Mitochondrial Abeta: a potential cause of metabolic dysfunction in Alzheimer's disease. IUBMB Life, 58(12): 686–94.

Cheng J, Guo X, Zhang T, Zhong L, Bu G, Chen X. (2016). TREMs in Alzheimer's disease: Genetic and clinical investigations. Clin Chim Acta. Dec 1;463:88-9.

Cheng ST (2016). Cognitive Reserve and the Prevention of Dementia: The Role of Physical and Cognitive Activities. Current Psychiatry Reports. 18 (9): 85.

Daroff RB (2020). Alzheimer's disease and other dementias. In: Bradley's Neurology in Clinical Practice. 7th ed. Philadelphia, Pa.: Saunders Elsevier

Desikan RS, Cabral HJ, Hess CP, Dillon WP, Glastonbury CM, Weiner MW, Schmansky NJ, Greve DN, Salat DH, Buckner RL, Fischl B (2009). Automated MRI measures identify individuals with mild cognitive impairment and Alzheimer's disease. Brain. 132 (Pt 8): 2048–57

Ding Jie; Davis-Plourde K L; Sedaghat S; Tully P J; Wang W; Phillips C; Pase M P; Himali JJ et al. (2019). Antihypertensive medications and risk for incident dementia and Alzheimer's disease: a meta-analysis of individual participant data from prospective cohort studies. The Lancet Neurology. ,19 (1): 61–70.

Escott-Price V, Schmidt KM (2021). Probability of Alzheimer's disease based on common and rare genetic variants. Alzheimers Res Ther., 13(1):140.

Farina N, Rusted J, Tabet N (2014). The effect of exercise interventions on cognitive outcome in Alzheimer's disease: a systematic review. Inter. Psychogeriatrics, 26 (1): 9–18.

Farina N, Rusted J, Tabet N. (2014). The effect of exercise interventions on cognitive outcome in Alzheimer's disease: A systematic review. Int Psychogeriatr., 26(1):9-18.

FDA (2021). FDA Grants Accelerated Approval for Alzheimer's Drug. FDA's Office of Media Affairs at 301-796-4540.

Feast A, Moniz-Cook E, Stoner C, Charlesworth G, Orrell M. (2016). A systematic review of the relationship between behavioral and psychological symptoms (BPSD) and caregiver well-being. Int Psychogeriatr., 28(11):1761-1774.

Fukushima RLM, do Carmo EG, do Valle Pedroso R, Micali PN, Donadelli PS, Fuzaro G, et al. (2016). Effects of cognitive stimulation on neuropsychiatric symptoms in elderly with Alzheimer's disease: A systematic review. Dement Neuropsychol., 10(3):178-84.

Gordon BA, Blazey TM, Su Y, Hari-Raj A, Dincer A, Flores S, et al. (2018). Spatial patterns of neuroimaging biomarker change in individuals from families with autosomal dominant Alzheimer's disease: A longitudinal study. Lancet Neurol.,17(3):241-50.

Greig NH, Mattson MP, Perry T, Chan SL, Giordano T,

Sambamurti K, Rogers JT, Ovadia H, Lahiri DK (2004). New therapeutic strategies and drug candidates for neurodegenerative diseases: p53 and TNF-alpha inhibitors, and GLP-1 receptor agonists. Annals of the New York Academy of Sciences, 1035290–315

Groot C, Hooghiemstra AM, Raijmakers PG, van Berckel BN, ScheltensP, Scherder E, et al. (2016). The effect of physical activity on cognitive function in patients with dementia: A meta-analysis of randomized control trials. Ageing Res Rev., 25:13-23.

Guerreiro R and Hardy J. (2014). Genetics of Alzheimer's disease. Neurotherapeutics. 11(4):732-7.

Gupta SC, Patchva S, Aggarwal BB. (2013). Therapeutic roles of curcumin: lessons learned from clinical trials. AAPS J., 15(1):195-218.

Hamaguchi T, Ono K, Yamada M (2010). REVIEW: Curcumin and Alzheimer's disease. CNS Neuroscience & Therapeutics (review). 16 (5): 285–97.

Hashimoto M, Rockenstein E, Crews L, Masliah E (2003). Role of protein aggregation in mitochondrial dysfunction and neurodegeneration in Alzheimer's and Parkinson's diseases. Neuromolecular Medicine. 4(1–2): 21–36.

Heneka MT, Carson MJ, El Khoury J, Landreth GE, Brosseron F, Feinstein DL, et al. (2015). Neuroinflammation in Alzheimer's disease. The Lancet. Neurology. 14 (4): 388–405.

Hernández F, Avila J (September 2007). Tauopathies. Cellular and Molecular Life Sciences, 64 (17): 2219–33. Hooper NM (2005). Roles of proteolysis and lipid rafts in the processing of the amyloid precursor protein and prion protein. Biochemical Society Transactions, 33 (Pt 2): 335–38.

Hoozemans JJ, Veerhuis R, Rozemuller JM, Eikelenboom P (2011). Soothing the inflamed brain: effect of nonsteroidal anti-inflammatory drugs on Alzheimer's disease pathology. CNS & Neurological Disorders Drug Targets, 10 (1): 57–67.

Hosseinian S, Arefian A, Rakhsh-Khorshid H (2020). A meta-analysis of gene expression data highlights synaptic dysfunction in the hippocampus of brains with Alzheimer's disease. Scientific Reports. 10: 8384.

Hsu D, Marshall GA (2017). Primary and Secondary Prevention Trials in Alzheimer Disease: Looking Back, Moving Forward. Current Alzheimer Research., 14 (4): 426–40.

Huang Y, Mucke L (March 2012). Alzheimer mechanisms and therapeutic strategies. Cell, 148 (6): 1204–22.

Jiang J, Jiang H., Low MM. (2015). Efficacy and adverse effects of memantine treatment for Alzheimer's disease from randomized controlled trials. Neurol Sci., 36(9):1633-41.

Kai K, Hashimoto M, Amano K, Tanaka H, Fukuhara R, Ikeda M. (2015). Relationship between eating disturbance

and dementia severity in patients with Alzheimer's disease. PLoS One, 10(8): e0133666.

Kempler D, Goral M. (2008). Language and Dementia: Neuropsychological Aspects. Annu Rev Appl Linguist; 28:73-90.

Kishita N, Backhouse T, Mioshi E. (2020). Nonpharmacological interventions to improve depression, anxiety, and quality of life (QoL) in people with dementia: An overview of systematic reviews. J Geriatr PsychiatryNeurol. 33(1):28-41.

Knopman DS, Parisi JE, Salviati A, Floriach-Robert M, Boeve BF, Ivnik RJ, et al. (2003). Neuropathology of cognitively normal elderly. J Neuropathol Exp Neurol; 62:1087-95.

Kotzbauer PT, Trojanowsk JQ, Lee VM (2001). Lewy body pathology in Alzheimer's disease. Journal of Molecular Neuroscience, 17 (2): 225–32.

Kracht F, Boekholt M, Schumacher-Schönert F, Nikelski A, Chikhradze N, Lücker P, Vollmar HC, Hoffmann W, Kreisel SH, Thyrian JR. (2021). Describing people with cognitive impairment and their complex treatment needs during routine care in the hospital - cross-sectional results of the intersec-CM study. BMC Geriatr., 12;21(1):425.

Krishnan S, Cairns R, Howard R (2009). Krishnan S (ed.). Cannabinoids for the treatment of dementia. The Cochrane Database of Systematic Reviews (2): CD007204.

Kuller LH (2007). Statins and dementia. Current Atherosclerosis Reports. 9 (2): 154–61.

Malouf R, Grimley Evans J (2008). Folic acid with or without vitamin B12 for the prevention and treatment of healthy elderly and demented people. The Cochrane Database of Systematic Reviews (4): CD004514.

Marjoribanks J, Farquhar C, Roberts H, Lethaby A, Lee J (2017). Long-term hormone therapy for perimenopausal and postmenopausal women. The Cochrane Database of Systematic Reviews, 1: CD004143

Matsuoka T, Manabe T, Akatsu H, Hashizume Y, Yamamoto S, Ogawa N, Kanesaka T, Taniguchi C, Yamamoto T, Mizukami K. (2019). Factors influencing hospital admission among patients with autopsy-confirmed dementia. Psychogeriatrics, 19(3):255-263.

Maust DT, Kim HM, Seyfried LS, Chiang C, Kavanagh J, SchneiderLS, et al. (2015). Antipsychotics, other psychotropics, and the risk of death in patients with dementia: number needed to harm. JAMA Psychiatry, 72:438-45.

McGuinness B, Craig D, Bullock R, Malouf R, Passmore P (2014). Statins for the treatment of dementia. The Cochrane Database of Systematic Reviews. 7 (7): CD007514

McKhann GM, AlbertMS, Sperling RA. (2012). Changing diagnostic conceptsof Alzheimer's disease. In: Hampel H, Carrillo MC, eds. Alzheimer's disease — Modernizing concept, biological diagnosis, and therapy.Basel, Switzerland: Karger, p. 115-21.

Monterey MD, Wei H, Wu X, Wu JQ. (2021). The Many Faces of Astrocytes in Alzheimer's Disease. Front Neurol.;12:619626.

Nicolas G, Charbonnier C, Campion D. (2016). From Common to Rare Variants: The Genetic Component of Alzheimer Disease. Hum Hered.;81(3):129-141.

Ohnishi S, Takano K (2004). Amyloid fibrils from the viewpoint of protein folding. Cellular and Molecular Life Sciences, 61 (5): 511–24.

Paradise M, Cooper C, Livingston G (2009). Systematic review of the effect of education on survival in Alzheimer's disease. International Psychogeriatrics, 21 (1): 25–32.

Patterson C, Feightner JW, Garcia A, Hsiung GY, MacKnight C, Sadovnick AD (2008). Diagnosis and treatment of dementia: 1. Risk assessment and primary prevention of Alzheimer disease. CMAJ., 178 (5): 548– 56.

Priller C, Bauer T, Mitteregger G, Krebs B, Kretzschmar HA, Herms J 2006). Synapse formation and function is modulated by the amyloid precursor protein. The Journal of Neuroscience, 26 (27): 7212–21.

Ralph SJ and Espinet AJ. (2018). Increased all-cause mortality by antipsychoticdrugs: Updated review and meta-analysis in dementia and general mental health care. J Alzheimers Dis., 2:126.

Reiss AB, Wirkowski E (2007). Role of HMG-CoA reductase inhibitors in neurological disorders: progress to date. Drugs, 67 (15): 2111–20.

Reveglia P, Paolillo C, Ferretti G, De Carlo A, Angiolillo A, Nasso R, Caputo M, Matrone C, Di Costanzo A, Corso G (2021). Challenges in LC-MS-based metabolomics for Alzheimer's disease early detection: targeted approaches versus untargeted approaches. Metabolomics, 17(9):78. Rosendorff C, Beeri MS, Silverman JM (2007).

Cardiovascular risk factors for Alzheimer's disease. The American Journal of Geriatric Cardiology, 16 (3): 143–49.

RWHO (2020). Dementia. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/ dementia. Accessed Dec. 8, 2020.

Schindowski K, Belarbi K, Buée L (2008). Neurotrophic factors in Alzheimer's disease: role of axonal transport. Genes, Brain, and Behavior. 7 (Suppl 1): 43–56.

Solfrizzi V, Capurso C, D'Introno A, Colacicco AM, Santamato A, Ranieri M, Fiore P, Capurso A, Panza F (2008). Lifestyle-related factors in predementia and dementia syndromes. Expert Review of Neurotherapeutics. 8 (1): 133–58.

Szekely CA, Town T, Zandi PP (2007). NSAIDs for the chemoprevention of Alzheimer's disease. Subcellular Biochemistry. 42. pp. 229–48.

Tan LY, Yeo XY, Bae HG, Lee DPS, Ho RC, Kim JE, Jo DG, Jung S. (2021). Association of Gut Microbiome Dysbiosis with Neurodegeneration: Can Gut Microbe-Modifying Diet Prevent or Alleviate the Symptoms of Neurodegenerative Diseases? Life (Basel), 15;11(7):698.

Tanaka H, Hashimoto M, Fukuhara R, Ishikawa T, Yatabe Y, Kaneda K, Yuuki S, Honda K, Matsuzaki S, Tsuyuguchi A, Hatada Y, Ikeda M. (2015). Relationship between dementia severity and behavioral and psychological symptoms in early-onset Alzheimer's disease. Psychogeriatrics, 15(4):242-7.

Van Cauwenberghe C, Van Broeckhoven C, Sleegers K. (2016). The genetic landscape of Alzheimer disease: clinical implications and perspectives. Genet Med., 18(5):421-30.

van der Linde RM, Dening T, Matthews FE, Brayne

C. (2014). Grouping of behavioral and psychological symptoms of dementia. Int J Geriatr Psychiatry. Jun;29(6):562-8.

Van Duinen-van den IJssel JCL, Mulders AJMJ, Smalbrugge M, Zwijsen SA, Appelhof B, Zuidema SU, de Vugt ME, Verhey FRJ, Bakker C, Koopmans RTCM. (2018). Nursing Staff Distress Associated With Neuropsychiatric Symptoms in Young-Onset Dementia and Late-Onset Dementia. J Am Med Dir Assoc.,19(7):627-632.

Walling SG, Rigoulot MA, Scharfman HE. (2007). Acute and chronic changes in glycogen phosphorylase in the hippocampus and entorhinal cortex after status epilepticus in the adult male rat. Eur J Neurosci., 26(1):178-189.

Watt JA, Goodarzi Z, Veroniki AA, Nincic V, Khan PA GhassemiM, et al. (2019). Comparative efficacy of interventions for aggressive and agitated behaviors in dementia. Ann Internal Med., 12:126-139.