# MENTAL HEALTH: ALZHEIMER’S DISEASE

## Alzheimer’s disease

Alzheimer’s disease (AD) is a chronic multifarious neurodegenerative malady with a dawdling inception that worsens over time. It is an incurable disorder with an extended preclinical period characterized by behavioral and cognitive impairment. The hallmark manifestation of AD is the insidious inception of memory impairment, which is commonplace among senior patients. In the U.S., approximately 5.5 million senior citizens aged 60 years and above have AD. Alzheimer’s usually interferes with the ability to reminisce new information. As a result, the patient may exhibit early impairment in language function, loss of decision-making capacity, deranged visuopartial capability, depression, delusions, and apathy. Also, brain scans show enhanced hippocampal and general brain atrophy. Nonetheless, neurological examinations often give normal results the extent of damage to the nervous system notwithstanding.

Historically, AD is considered the preceding cause of dementia with about 50-70% of dementia patients having a medical record of Alzheimer’s disease. Besides, its pathophysiology is intricate as it involves multiple neurotransmitter systems and pathophysiologic processes. There are suggestions that older people with Alzheimer’s may have other co-morbidities known as mixed dementia. AD affects over 35million elderly people globally. The prevalence is higher in women than men and incidence rate increases with longevity. The risk factors include the family history of the disease, small head size, head injury, and lower intelligence levels. Other risk factors such as hypertension, smoking, sedentary lifestyle, diabetes, and obesity are potentially preventable, yet they increase the incidence rate by twofold.

## Pathophysiology of Alzheimer’s Disease

AD pathology has three hallmarks including extracellular β-amyloid plaques, neurological cell death, and intracellular neurofibrillary tangles (NFTs). The three core factors vary based on the sequence, location and the timing of neurotransmitter changes during AD progression. Intracellular neurofibrillary tangles and extracellular β-amyloid plaques are the preliminary histopathologic features of AD, and their given quantity is considered the gold-standard for Alzheimer’s disease (Imbimbo, Lombard & Pomara, 2005). Amyloidal protein deposits are insoluble compounds that contribute to senile plaques. Other manifestations include hippocampal neuronal loss, aneuploidy, and synaptic degeneration. The hippocampus and amyloid proteins are deposited in blood vessels thereby causing a condition known as congophilic angiopathy (Kaplan & Hoffman, 1998). Amyloid plaques inhibit synaptic activity and instigate a cascade of downstream effects that cause increased interneuronal and intraneuronal dysfunction. Eventually, cell death occurs.

## Amyloid Plaques

They contain β-amyloid (Aβ) protein which is an amino acid peptide formed through the proteolytic cleavage of APP by enzymes β-secretase and γ-secretase. The principal end-products are β1–40 and Aβ1–42. Excessive production of Aβ1–42 causes an aggregation of amyloid into oligomers and fibrils which amass to form amyloid plaques. Aβ is the primary contributing factor to the pathogenesis of AD due to its toxic nature (Mahley, Weisgraber & Huanmng, 2006). Soluble Aβ complexes with Zn2+, Fe3+, and Cu2+ forming free radicals which mediate the obliteration of neurons. It kills neurons, damages synapses, and leads to the loss of long-term potentiation. Apparently, all the proteins encoded by APP gene, located on Chromosome 21, are linked to the generation, processing, and trafficking of amyloids which is found in substantial numbers in Alzheimer’s patients.

## Neurofibrillary Tangles (NFT)

 Tau protein is involved in microtubule assembly which is an indispensable process required for normal axonal growth and neuronal development. Nevertheless, once it becomes hyperphosphorylated, tau protein assemble into helical, filamentous neurofibrillary tangles which are deposited in neurons situated in the frontal association cortices, lateral Pareto temporal region, and the mesial temporal lobe especially the hippocampus. Tau NFT aggravates the symptoms and severity of Alzheimer’s dementia. It is a secondary cause of AD.

## Neuron and Synapse Degeneration

 The degeneration of neurons located in the nucleus basalis of Meynert results in a discrepancy in Acetylcholine which is the principal neurotransmitter involved in memory. On the other hand, the destruction of locus ceruleous and median raphe causes norepinephrine deficit and serotonin deficiency respectively (Friedman, Adler, & Davis, 1999). Consequently, the cholinergic deficits lead to aberrant cerebral and serotonergic and adrenergic activities which contribute to insomnia and dysphoria in patients with AD.

## Impact of Advanced AD Dementia on Cognition and Understanding

Advanced Dementia affects the cognition and understanding of the patient. The commencement and progression of the disease reduce fluent language to simple phrases, single words, or it may sometimes lead to complete loss of speech (Mitchell et al., 2009). As a result of vanished verbal language capability, the patient may return emotional signals in correspondence. The patient also exhibits considerable levels of aggressiveness, extreme apathy, and exhaustion. Additionally, muscle mass and mobility deteriorate significantly meaning the patient will not be able to perform simple locomotive tasks including walking or feeding independently. AD does not lead to death as a standalone disorder. Rather, the presence of co-morbidities such as pneumonia and pressure ulcers may cause the patient to succumb to death.

## Assessment and Overall Management

## Focused Physical Assessment

The main complaints are the Marie forgets to use her frame when walking. She fell when self-mobilizing to the toilet. The patient appears alerted but distressed, uncomfortable; frightened and resistant. Marie has a history of hypertension, Alzheimer's disease, and mild depression. She has no history of smoking, recreational drug use or significant alcohol consumption. On initial examination, her skin is normal regarding moisture content, appearance, texture, and temperature. However, she has a 4cm Abrasion to her right elbow. Her oral pharynx, tongue, and gums are normal. There are no exudates or erythema. However, the patient’s speech is sporadic and displays noticeable signs of anxiety. She affirms that she is ‘not going anywhere’ when she is ushered into the examination room.

Marie appears to have lost significant weight considering the weight record from her last visit to the hospital for treatment of hypertension. Muscular twitches occur occasionally. Numbness, weakness, and in-coordination are apparent (Khachaturian, 1985). Her lower limbs have lost mobility because she is just seated on the flour and cannot stand by herself. Also, Marie’s right leg is shortened and rotated. The neck is flexible and moves without significant resistance. Laboratory test results show elevated Tau protein and decreased Aβ levels in CSF. Other results indicate thatPlaques and tangles widespread in the brain and parts of the brain are severely atrophied (Perl, 2010). There is perceptible neuroinflammation, decreased acetylcholine levels and the patient has constant hallucinations. Additionally, cardiovascular assessment tests indicate the presence of cerebral infarcts and lobar hemorrhage. Lastly, the patient lacks bladder and bowel control

 Vitals: RR: 22, SPO2: 97%, HR: 108, BP: 152/81, Temp: 36.9, B.M: 7.0, ECG: unremarkable.∙

## Overall Management

The overall management of the patient will involve the regulation of behavioral and psychological symptoms of dementia including aggression, depression, and agitation. It will also involve the administration of supplementary therapy including prevention food vitamins, memory boosters, and pain relievers including Asprin and Tylenol (Zwakhalen et al., 2006). Marie will be rehabilitated in a nursing home to facilitate a long-term follow-up program that will last for eighteen months to ensure that clinically-relevant outcomes are achieved (Kishore et al., 2013). The clinical underpinning for this deliberation is Marie’s condition is advanced meaning that the patient is utterly dependent on caregivers. Besides, an acute hospital ward or residential care home can be a distressing and disorienting environment for a patient with dementia due to heightened and inevitable noise, unfamiliar staff, and bright lighting (Lynn & Adamson, 2003).

A nursing facility placement will foster a safe environment which will enable the patient to maintain quality life, enhance mood, cognition, and behavior, and promote appropriate social engagements. The patient will be given 1 non-competitive glutamate receptor antagonist which is the most widely recommended remedy for the treatment of advanced AD. Memantine will be dispensed to target the latter phase of the disorder and minimize its impact (Howard et al., 2012). It will slow down the progression of AD to its most insidious phase, and provide symptomatic relief to the patient thereby prolonging her pain-free lifespan even though a definite cure will not be achieved promptly. Additionally, she will be administered doses of Vitamin E and C medications, statins to reduce cholesterol levels, and non-steroidal anti-inflammatory drugs to prevent further progression of the prevailing medical condition (Winblad et al., 2016).

## Ethical and Legal Considerations

It is important for Marie and her family to be made aware of the ethical issues related to dementia to ensure that management and treatment of the disease is smooth. The whole treatment process should be consistent with the ethical standards stipulated for the diagnosis, treatment, safety of the patient, end-of-life issues, and whether Marie should or should not participate in research. The basic ethical consideration of Marie’s case is to respect her rights and cease from exposing her to conditions that would otherwise undermine her autonomy. Marie should be taken through a dignified diagnosis medical process which entails making her the center of the procedure. Being the patient suffering from Alzheimer’ disease, the nurse and doctors should talk to her directly. She is the individual that needs to know first although her family is equally entitled to the information. The nurse should always tell Marie the truth and desist from conveying irrelevant or inaccurate information to her. The nurse should always deliver the news in a plain and sensitive language as stipulated by Hippocratic Oath. All the medical procedures that Marie has to undergo must always be explicated and validated to her and her family members. The nurse should not force any procedure on Marie when she or her family disagrees with it.

Diagnosis of Alzheimer’s disease does not guarantee that Marie has lost her decision-making ability. Therefore, Marie’s autonomy should be respected and only taken away when a qualified doctor proves beyond reasonable doubt that she has lost her decision-making capacity. Otherwise, she should be allowed to exercise sound decision making which is consistent with her constitutional rights (Appelbaum, 2007). Failing to confer Marie her autonomy seriously dents her independence and dignity as a human being. Although Marie should be protected from harmful consequences emanating from irrational reasoning, she should still be given the right to do so as prescribed by constitutional and medicals regulations. Marie’s decisions must be prioritized except in situations where safety becomes a critical consideration, and restrictive alternatives are inevitable. Additionally, the issue of alternative treatments such as ‘prevention’ foods and medicines and ‘memory/brain booster’ supplements is a legal issue that often raises legitimate concerns when dealing with AD patients (Mutsalklisana et al., 2016). The use of these drugs should be avoided in case the patient, and her family declines administration or the physician-prescribed therapy fails to endorse its use. This is because patients are protected by the law from using drugs whose safety, effectiveness, and purity standards are unknown. Besides, the adverse reactions caused by these drugs are not frequently monitored (Gold et al., 2001). Furthermore, dietary supplements may interact with prescribed medications and produce insurmountable affects.

## Person-Centered Approach to Patient Management

Marie’s condition requires a person-centered nursing approach to improve the overall experience of the patient and restore hope in longevity (Edvardsson, Winblad, & Sandman, 2008). An interpersonal connection between the physician and the patient will be created to improve clinical outcomes, increase patient satisfaction and enthusiasm, and enhance cost-effectiveness (Hux et al., 1998). To maximize patient-clinician correspondence, Marie will be taught how to communicate using both verbal language and non-verbal sign cues to ensure that she actively participates in her care (Herr et al., 2006). The patient will receive training on how to develop resilience throughout the continuum of care. She will be assigned only two caregivers; one of whom will be the clinician and the other a nursing assistant, to prevent her from interacting with too many strange people. Since patient experience underscores the success of this program, a feasible framework for addressing the challenges experienced by the patient will be laid to facilitate compassion and respect (Mittelman, Epstein, & Pierzchala, 2003). Marie’s family especially her daughters will be encouraged to come on board and assist in shared decision-making about referrals and choosing a suitable nursing facility placement for their elderly kin. Furthermore, they will be handy in helping the health caregivers to implicit the uniqueness and individuality of their parent before selecting an appropriate care plan for her.

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