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Overview of Alzheimer's Disease

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Abstract. Alzheimer's disease (AD) has become more and more common in older people, and the data show that the number of people with AD might increase rapidly in the next few decades if there are no interventions and prevention. However, some people are still confused between AD and dementia. Lots of people believe that dementia is a sign of getting old, so it is common and normal. Thus, some people with AD may miss the most important time to find treatment, which could cause them to be in a more serious condition. Knowledge about AD is still not propagated. This paper wants to show the importance of familiarity with the symptoms and treatment of AD. Forgetfulness is one of the typical symptoms, but there are other symptoms that people are not aware of, such as personality change, depression, and language ablilty. Therefore, people need to either prevent this disease or get intervention earlier. Although there is no medication or surgery to cure AD, nonpharmacologic and pharmacologic treatments are helpful to reduce some symptoms and slow the progress of AD. A healthy lifestyle also plays a significant role in preventing AD, and a healthy lifestyle could decrease the risk of AD and have positive outcomes for people with AD.

Keywords: Alzheimer's disease, symptom, dementia, treatment

1. Introduction

In the United States, according to the official data from 2018, Alzheimer's disease (AD) is the sixth major cause of death, especially among Americans age 65 and older [1, 2, 3]. AD has also became one of the most expensive and challenging diseases in this century. People with AD need to spend more than double the amount of their wealth on their care compared to people without AD [1]. As the morbidity rate of AD increases, the shortage of caregivers, geriatricians, and primary care physicians also increase. Many people and their families are not able to afford the fee of medication and caregivers because people with AD are dependent on others for most of the time. The duration of caregiving is extremely long, so it brings tremendous stress.

Finding treatment for AD has become a difficult problem in the world. Although there is no treatment to cure AD, intervention and prevention are very helpful to slow the progression. However, there are many myths about AD that are misleading people, so some people are always confused about AD. This paper introduces different stages, symptoms, and treatments of AD, which can help people understand AD completely and correctly in order to prevent it in advance and get intervention at the beginning of the AD.

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2. Alzheimer's disease

People usually consider AD as dementia, which affects older people's memory slowly. In fact, AD is one of the main causes of dementia, and there are many different causes of dementia [4]. However, AD is the most common cause. Approximately, 60% to 80% of cases of dementia are caused by AD [1], so people always use the term "dementia" to refer to AD. It affects a large number of individuals worldwide, especially elderly people.

Alzheimer's disease is a brain disease and a progressive degenerative disease. The morbidity of AD increases with age, and the number of people who are older than 85 years old will live with AD in 2050 if there is no any prevention in the United States [1, 5]. The population will increase rapidly and dramatically in the future because of the growing aging population. Furthermore, forgetfulness is a typical symptom of AD, which is well known. Symptoms of AD will become worse and worse, and the degree of cognitive impairments also increase with time. As a result, it is difficult to detect AD in the early stages until individuals exhibit symptoms that interfere with their daily activities, such as memory loss and speech abnormality [1, 2].

Due to AD's being a progressive disease, individuals will experience different symptoms from mild to moderate to severe over time. Most people are able to do the daily activities independently in the early stages, but their memory and attention will decrease [1, 6]. At this stage, the majority of people and their families will not even realized that this could be the symptom of the disease. Many people will consider that it is normal to get old, so it is difficult to distinguish the AD in the mild stage and being old. Thus, people usually know that they developed AD in the moderate stage. The symptoms become obvious in the moderate and severe stage, and it is also the longest stage lasting two to ten years [1, 4, 7]. Individuals may have difficulties doing daily activities in the moderate stage. In the severe stage, individuals with AD become bed-bound because most nerve cells are damaged [7]. Being bed-bound makes them have difficulty in swallowing food, so the food in the lung could cause a lung infection, which is aspiration pneumonia; this type of infection is one of the main causes of death among patients with AD[1, 2, 4, 6]. Thus, most patients need assistance to take care of their activities of daily living all the time.

3. Symptom of AD

Memory loss and difficulty with movement are well known and hallmark symptoms of AD, but there are also other symptoms that people pay less attention to, such as personality change, depression, and impairment of language.

3.1. Personality

Most people think that personality is stable to a certain extent from early childhood to late adulthood except for some small possible changes if the individual does not experience trauma or brain damage [8, 9, 10]. However, it is well established in many studies that some individuals with AD show changes in their personality and mood in the early stage of AD compared to normal aging [9, 11, 12]. Their family or friends may notice that they behave differently, but they may not be aware that it is one of the symptoms of AD. It can cause neuropsychiatric symptoms, which are also known as mood symptoms [4]. Impairment of cognitive ability and other functions will influence their mood and personality, so people with AD will act and think differently than usual [1, 9].

These personality and mood changes and some other symptoms could reflect the progression of brain damage and stage of AD [12, 13]. Individuals who have noticeable symptoms of AD mean that the neurons in their brain have been damaged, which has already affected their daily basic functions, so those psychological and physical changes might be useful for their family members to detect AD or dementia [9, 12, 13].

3.2. Depression

Except for personality change, an individual's psychological states will also be influenced by AD. Depression is also a common mental disorder in the world, and lots of people struggle with depression

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and anxiety. It is not only common in people without any disorder, but also in people with AD who suffer from both AD and mental illness. Moreover, individuals with AD have a greater risk of developing mental problems, and those individuals could experience depression at any stage. Furthermore, one-third of individuals with AD at an early stage show some psychological symptoms [1, 14]. Individuals with AD in the severe stage have problems expressing their feelings and doing some activities to relax themselves, so getting intervention is really important.

Although some people doubt the relationship between depression and AD, some research has demonstrated that there might be a causation relationship, and both personality and psychological symptoms, like depression, occur before any noticeable symptoms [12, 14]. Thus, depression has also become one of the signs of AD, which can help people diagnose AD earlier and get intervention.

3.3. Language

Communication is the most important way to build a good relationship and a strong connection with others. It is well known that effective communication can not only reduce stress but can also maintain one's cheerful mood, which also has lots of benefits to the human body and any treatment. Less stress and good mood could protect individual from any diseases, and having a good communication with each other and remaining socially can support brain health in order to help lower the risk of AD [1]. Although many researchers found that language deficits occur in the early stage of the AD, individuals can still express their feelings and needs to others; and communication is strongly affected during the severe stage of AD [7]. It becomes very difficult for individuals to talk logically. Impairment of language forces them to withdraw from social contact and activities completely, which is worse for the individual's brain and life quality.

The different stages of AD have specific difficulties in five domains: phonetics and phonology; morphology; lexicon and semantics; syntax; and pragmatics; and they are all influenced by AD [1, 7]. This symptom is more obvious than personality and depression in later stages of AD because language also needs memory and cognition functions, which are damaged in the first stage. Therefore, the difficulties in different domains of language indicates the progress of AD [7].

4. Treatment of Alzheimer's dementia

Most people have a certain forgetfulness when they get older, so the distinction between AD and aging becomes blurred. When people notice that it is a symptom of AD and not just simply being old, most people are in the mild or severe stage. AD is the most expensive and helpless disease, because there are no treatments to cure AD and stop the damage of neurons in the brain for now. However, it is a common disease in the world, so many researches suggest that prevention is the first thing to do in our daily life.

Individuals with AD experience unnoticeable memory impairment in the beginning, followed by personality changes, mood symptoms, and language abnormalities, and then incapable self-care until death in the severe stage [2]. Some people with AD in the severe stage might become bed-bound in their last few months or years [2, 7]. Not only do people with AD suffer from this disease, but their families also experience extreme stress and pain from the loss of memory about them.

Prevention and treatment are significantly important in daily life in order to reduce the risk of AD and slow all the symptoms it has.

4.1. Prevention

The data shows that effective prevention of AD can reduce approximately 35% of cases worldwide [1, 15]. The importance of increasing focus on prevention need to be propagandized to the public. AD causes people's brain damage, so keeping brain health and having a healthy life could protect brain function. Reading, exercising, meditation, and thinking are well-known activities that are good for the human body and also can exercise the brain constantly. Furthermore, researchers show that social interactions and diet also can keep brain health [4, 16]. Having frequent social interaction with others could help people develop better cognition functions and release stress, which have significant benefits

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[1, 4]. People who are living isolated lives will be affected by their mental health and have a higher risk of getting other diseases. In addition, previous research found out recently that the Mediterranean diet, which includes eating more vegetables, fish, and fruits and less meat and poultry, can preserve the brain and lower the risk of getting AD [16, 17]. People who ate a Mediterranean diet for a few years had higher scores on cognitive tests compared to people who did not eat a Mediterranean diet, which lowered the risk of dementia up to 40% [17], so eating style also plays a huge role in brain health.

Alcohol and drugs are common and unhealthy substances, and people use them all the time. Less harmful substances are one of the standards of healthy living. There are a large number of studies demonstrating that avoiding harmful substances can reduce one-fifth of the AD population by 2050 [17]. Thus, having a healthy lifestyle in every aspect can decrease the risk of getting AD and other diseases. Prevention previously is always better and effective than treatment after having AD.

4.2. Treatment

However, many studies show that some treatments could slow the progression of AD, and the it is the most effective and helpful during the early stage of the AD [1, 4]. This period is key and crucial for treatment, so people should be sensitive to the symptoms of AD and treat it timely to slow the progression. Although AD can not be cured, there are still pharmacologic and non-pharmacologic treatments to help people with AD relieve some symptoms.

4.2.1. Pharmacologic treatment. It has been identified that there are two types of medication and five drugs are approved for the treatment of AD [2, 7]. For the mild and moderate stages of AD, acetyl cholinesterase inhibitors could help people to reduce symptoms related to cognitive ability, such as galantamine and donepezil, and memantine is a receptor antagonist to block the receptors in order to prevent excess stimulation, which can damage the brain [1, 2]. Both acetylcholinesterase inhibitors and memantine could slow the progress of AD by replacing neurotransmitters for a short period [2, 15].

Moreover, antipsychotics are the medications to manage psychosis such as hallucinations, aggression, and depression, but they have a higher risk of having a stroke and causing death [1]. However, researchers have not found a way to cure AD yet and the different people have various symptoms, so it is hard for physicians to prescribe any medication. Thus, the most important element in treating AD is to diagnose and treat it as early as possible so that it is effective and useful [1].

4.2.2. Non-pharmacologic treatment. Exercising not only could prevent AD, but it also has benefits for cognitive function[1]. Some psychological treatments can also be used to treat patients with depression, aggression, and anxiety. Non-pharmacologic therapies such as cognitive stimulation, music-based therapies, and art therapies could prove effective for the symptoms of AD. Like with pharmacologic therapies, non-pharmacologic therapies cannot cure AD, but many studies show that these therapies are more helpful in reducing aggression for individuals with AD [1].

5. Conclusion

AD is an intractable disease for many researchers and physicians. There is no cure to treat AD, but prevention is very helpful to decrease the risk of AD, and treatment can reduce the symptoms. Realizing the symptoms and diagnosis by physicians is extremely important, because getting timely intervention is very helpful for people with AD. Moreover, there is an acute shortage of caregivers, geriatricians and primary care physicians to meet current demands for people with AD. Each patient needs one or more people to take care of their daily lives, because some of them may have eating problems in the severe stage. It is one of the most expensive diseases.

One of the difficulties of AD is that the symptoms of each patient are different. This paper only talks about few symptoms of AD, but some patients may not experience all the symptoms listed above. However, compared to other diseases, AD has nit been fully discovered yet. Further research needs to

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develop better approaches to analyse AD, focus on finding treatment for AD, and then decrease the cost of AD to the medical care system.

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