Alzheimer’s Disease- an Existential Threat?

Alzheimer’s disease (AD) is a neurodegenerative disorder, presenting as a progressive dementia primarily affecting episodic memory, accompanied by specific neuropathological changes. It is the third leading cause of death in the ageing population. The risk of development increases with age; 1 in 3 individuals are affected by the age of 80.[1,2,3]

An Alzheimer’s diagnosis can undoubtably be devastating for patients and their families; however, we must also consider the socioeconomic burden on wider society. AD will increasingly place an extraordinary strain on health systems and social care services, but it seems that many governments are not adequately preparing for the inevitable impact on their populations.

The cost of treating and caring for AD patients in Europe alone was estimated to be 232 billion euros in 2015, and could reach 509 billion euros in 2030. This increase can be attributed to a higher number of diagnoses, and possible future medical intervention able to prolong lives of patients suffering with the disease, who may continue to require care over longer periods of time.[4,5] One study indicated that there will be more than 105 million cases of AD by 2050.[6]

There is currently no cure for AD. Available treatments can temporarily delay progression of cognitive symptoms in mild-to-moderate stages of the disease, through regulation of neurotransmitter activity. A recent drug development, ‘Aducanumab’ has been found to reduce some of the hallmark cerebral pathologies; however, there is still no conclusive evidence that this reduces cognitive symptoms. [7,8,9,10]

Familial Alzheimer's disease is known to have a strong genetic causal component. Risk of late-onset AD (where symptoms start after 65) is thought to be associated with both genetic and several modifiable lifestyle factors. These include low educational background, diet, midlife obesity, diabetes, sedentary lifestyle, lack of sleep, smoking, and depression. Given the lack effective pharmaceutical treatments, the importance of lifestyle and dietary factors has increasingly come to be recognised. [8,11,12,13]

Many risk factors are closely associated with aspects of ‘Western’ diet and lifestyle. Risk of AD is strongly associated with a high intake of saturated fats, cholesterol and iron, (primarily through meat and animal products), obesity, and lack of exercise.[7,13,14] Patients who follow this ‘Western dietary pattern’ (a diet including more frequent consumption of processed or ‘fast’ foods, saturated fats, refined grains, sugar, and alcohol) are also likely to exhibit faster progression of symptoms.[14] Furthermore individuals with diabetes have on average a 56% increased risk of developing AD.[15] Patients who suffered from lung cancers (strongly associated with smoking) also reported a higher prevalence.[13]

Several diets have been suggested which may be of help to AD sufferers, including the Ketogenic (KD), Mediterranean (MedDi) and Mediterranean-DASH Intervention for Neurological Delay (MIND). KD in particular is thought to have several neuroprotective qualities, including activating stress proteins which support mitochondrial activity, (particularly beneficial as mitochondrial dysfunction is common in AD brains), decreased production of reactive oxygen species (ROS), and decreased inflammatory response. [7,8,16,17] This been shown to reduce the density of amyloid-β plaques, one of the hallmark pathologies of AD; furthermore, one study found patients suffering mild-to-moderate AD displayed decreased dementia symptoms dependent on the duration of the diet.[7,8]

Similarly, MedDi and MIND diets have been associated with reduced AD risk and cognitive decline, generally attributed to a high consumption of olives rich in biophenols. [7] These promising outcomes suggest these diets could be a useful preventative treatment in early stages of AD.[8,16]

Strong evidence suggests that sufficient exercise - particularly high intensity training (HIT), regular sleep patterns and prevention of obesity may reduce the risk of developing AD.[8,11,18] Some research also suggests that a healthy gut biome may have an impact on the incidence of AD, and of course this is likely to be linked to diet/lifestyle factors.[11]

Modern medicine has allowed us to live longer than ever but AD may mean that an increasing number of us will need support and care in our later years. The sheer number of potential sufferers and the level of care they may require could very easily overwhelm the NHS and the current social care system which is already under strain. Long-term funding and care models need to be developed whilst we search for pharmaceutical cures or preventions.

If the onset of AD or its symptoms could be delayed by only one year, there could be over 9 million fewer cases in 2050.[6] Alzheimer’s disease is an issue we cannot afford to forget.

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