Dementia is a category of brain disorders that describes impairments in cognitive functioning. The most common form of dementia is Alzheimer’s disease, accounting for between 50% and 70% of all dementias. The remaining 25 to 50% of dementias are accounted for by other causes. Vascular dementia, for example, is a type of vascular cognitive impairment caused by various types of cerebrovascular disease, such as stroke. Cognitive disorders, including dementias, become more common with age. Thus, 3% of people between the ages of 65 and 74 have some form of dementia, while this figure rises to 47% in people over the age of 85.

Australia’s population, like that of most developed countries, is ageing. 13.7% of Australians are now over the age of 65 compared with 8.3% in 1971. The population over the age of 85 has likewise increased from 0.5% in 1971 to nearly 2% in 2011. The cost of ageing-related care to society is set to consume up to 2% of Australia’s GDP by 2050.

Australia and the world’s population is also gaining weight, with more than 60% of Australians now classified as overweight or obese. Obesity is a significant risk factor for dementia, linking strongly with cognitive decline during ageing. For example, clinical and experimental evidence indicates that obesity and/or eating a high fat diet are associated with deficits in learning, memory, executive functioning, and potentially brain atrophy. Ageing and obesity independently and additively contribute to dementia and loss of cognitive function. Thus, obesity appears to exacerbate the cognitive deficits associated with ageing. For instance, the Framingham Heart Study showed that higher body mass index is associated with lower cognitive performance (learning, memory, and executive function) in elderly individuals. Higher body mass index or waist-to-hip ratios in middle age are associated with an increased risk of developing Alzheimer’s and vascular dementia later in life. Thus, the spiraling levels of obesity in Australia and around the world may well exacerbate the incidence of dementia and degree of cognitive impairment, particularly in the ageing.

Data from humans and rodents suggests dementia-related cognitive deficits that occur with ageing and obesity are, at least in part, due to brain inflammation developing as we age and as we are exposed to high fat diet. Markers of inflammation are associated directly with deficits in cognitive function and with diseases that are risk factors for cognitive decline. For instance as pro-inflammatory cytokines such as interleukin-6 increase, performance in the Mini-Mental State Examination worsens and evidence of peripheral inflammation, such as higher plasma levels of interleukin (IL)-12 and 6 are linked to reduced speed in processing information and a faster rate of cognitive decline.
In addition to ageing per se, obesity and a diet high in saturated fat also contribute to central inflammation and are significant predictors of cognitive decline as an individual ages. Thus, metabolic syndrome and systemic inflammation have both been identified as independent risk factors for cognitive dysfunction and neurological disorders such as depression in older people.

Understanding how this inflammation affects cognition in healthy versus overweight populations may allow interventions, such as those aimed at reducing inflammation, to combat cognitive decline during ageing. Encouragingly, several studies have how suggested relatively mild interventions may be capable of improving dementia-related outcomes and quality of life. Thus, moderate-intensity exercise is associated with a reduced risk and slower progression of age-related mild cognitive impairment. There is also emerging evidence of increased neurogenesis (new brain cells being born) in multiple brain regions in elderly brains following exercise training. In addition, exercise can improve inflammatory status and cognition in the obese. Moderate exercise may therefore be a useful strategy to combat age-related inflammation, particularly in obese populations.

With an ageing and increasingly obese population, Australia is facing a significant increase in the proportion of its citizens suffering from dementia. There is a clear need to discover the mechanisms behind how inflammation contributes to cognitive impairment, and so develop the tools to prevent and treat it. Moderate exercise may be one important strategy in reducing brain inflammation and thus reducing one of the major causes of dementia.

References:


