**EDITORIAL**

**Impact of Physical Activity and Nutrition on Dementia: A Growing Consensus**

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 It is well known that the quality of one’s home environment has profound effects on health.1 Home hygiene and sanitation, food storage and preparation practices, waste disposal, animal care, air circulation, second-hand smoke, and proximity to sources of pollutants such as factories have all been demonstrated to affect physical and psychological health.2,3 As a case in point, consider the not uncommon situation of an impoverished 87 year old woman living in a dilapidated dwelling. Days of dirty dishes are piled in the sink; indoor trash cans are overflowing; a can of open beans is sitting on the counter; the dog is infested with fleas and has left feces on the bedroom floor; dirty clothes are scattered on chairs; lightbulbs are burnt out, and cockroaches wander with impunity. Living in such a home would clearly have a marked impact on her physical and psychological health.

 The home of the brain is the body. It should come as no surprise, then, that the condition of the body would affect the brain. Extreme examples include encephalopathies from toxins such as toluene, a variety of alcohol-linked brain diseases, and the strong connection between cardiovascular and cerebrovascular disease. Extending the analogy, it seems quite reasonable that health behaviors such as diet and physical activity, which have been demonstrated to impact many physical diseases, would also influence brain disease.

 Dementia is an umbrella term for a range of progressive conditions that affect the brain. There are over 200 subtypes of dementia; the five most common are Alzheimer’s disease, vascular dementia, dementia with Lewy bodies, frontotemporal dementia, and mixed dementia.4 Dementia is a global epidemic, affecting an estimate 47.5 million persons worldwide in 2015, expected to increase to 75.6 million in 2030 and 135.5 million in 2050.5 It most commonly affects older adults, meaning that the rapid increase in the proportion of adults living into old age across the globe is the key driving force behind the increase in dementia.5 Importantly, dementia is one of the main causes of disability and dependency in older adults and has profound detrimental psychological, social, physiological, and economic impact on persons living with the disease, their families, other care providers, and society as a whole.6

 To date, there is no cure for dementia; therefore, preventive efforts are the key to tackling its increasing prevalence. Moreover, there is a growing body of literature to suggest that introducing or maintaining a healthy lifestyle once diagnosed with dementia can improve or delay the decline in symptoms and health outcomes relating to the condition. The goal of this topical issue of JAMDA is to better understand whether, and if so how, dementia’s onset and progress are affected by two key lifestyle components: physical activity and diet.

 Lack of physical activity has been associated with dementia in a number of previous studies. A recent meta-analysis investigated the relationship between time spent sedentary and risk of dementia; 18 cohort studies involving 250,063 participants and 2,269 patients with incident dementia were included. Pooled results showed that sedentary behavior was significantly associated with increased risk of dementia (RR = 1.30; 95% CI: 1.12–1.51). The meta-analyses concluded that sedentary behavior was independently associated with a significantly increased risk of dementia.7 However, research focusing on reducing sedentary behavior in older adults with dementia is scarce and more attention to its potential is required.

 Another recent meta-analysis examined the relationship between leisure-time physical activity and dementia risk. Five studies were included in a dose-response analysis, which identified that lower levels of physical activity were associated with higher risk of dementia.8 Unlike sedentary behavior, for which intervention studies are limited, a large body of literature exists that investigates the promotion of physical activity in persons with dementia focusing on health outcomes of physical activity and methods by which physical activity can be promoted.9,10

 Nutritional status has also been shown to be a risk factor for developing dementia. Multiple meta-analyses have confirmed an association between higher levels of vitamin D and lower dementia risk.11,12 Other literature has found an association between adhering to a Mediterranean diet and lower risk of dementia,13,14 as has adequate fruit and vegetable consumption.15,16 The literature examining the association between specific nutrients and dietary patterns is vast, and numerous studies have explored a plethora of nutrients and dietary patterns in addition to those mentioned here.

 Adding to a large body of literature examining the relationship between nutritional status and risk of dementia, many studies have investigated the association between nutritional status and behavioral and health outcomes in persons with dementia. For example, malnutrition is significantly associated with behavioral expressions in dementia (historically referred to as behavioral and psychiatric symptoms of dementia),17 higher hospitalization rates,18 and mortality.19

 In sum, sedentary behavior, physical activity, and diet have been shown to impact the prevention and management of dementia, but more research is needed in all areas to better inform recommendations for policy and practice.

 The October (2020) topical issue of JAMDA, “Impact of Physical Activity and Nutrition on Dementia” was assembled to advance knowledge of the determinants and outcomes associated with physical inactivity/activity and diet in relation to dementia. One original paper reports on the relationship between physical activity and cognitive complaints among persons living in low- and middle-income countries, which is of particular concern given that 58% of people with dementia live in these countries; it found significant associations of physical activity with both subjective memory and learning complaints. 20 A second paper establishes that poorer nutrition is associated with clinical progression in cognitive impairment among individuals already experiencing decline.21 A third original study examines relationships between nutritional parameters and dementia subtypes, finding that persons with Lewy body and vascular dementia were more likely to be malnourished, while persons with frontotemporal dementia were less likely to be malnourished.22

Four papers in the issue are literature reviews, with syntheses identifying key themes and directions for future research. One reviews cognitive effects of calorie restriction, focusing on four biological mechanism including oxidative stress reduction, anti-inflammatory response activation, neurogenesis and synaptic plasticity promotion, and brain structure and function protection.23 In the other reviews, the beneficial impact of the Mediterranean diet for cognitive health,24 and of nutritional supplements to treat malnutrition25 are affirmed, as is the benefit of activity and exercise (albeit with a low or very low level of certainty).26

Even though there is always cause for more research into determinants and outcomes, there is no evidence or suggestion that physical activity and good nutrition constitute *risk factors* for the development or progression of dementia or poor health. And so, additional research is not required to justify promoting physical activity and good nutrition. For practitioners caring for persons with dementia, patients’ families and other caregivers are key to promoting better lifestyle choices – and in so doing, they may well be improving caregivers’ own lifestyle choices, thereby improving cognitive and health outcomes for generations to come.

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