Cognitive health

Promoting a brain-healthy lifestyle

Simple adjustments to diet, exercise and social and cognitive stimulation, can slow the effects of ageing on the brain, say Christine Ganzer and Cheryl Zauderer

Summary

The population of older adults is increasing worldwide. Old age is often associated with a continuous decline in memory and along with other forms of cognitive decline can impede the self-management abilities necessary for everyday functioning. Recent research suggests that adapting a brain-healthy lifestyle may reduce age-related cognitive decline and, in some instances, improve memory and thinking. As a health educator the gerontological nurse can help older people to navigate the information essential to improving brain health. Nurses can incorporate knowledge about brain-healthy behaviours into older adults’ routines.

Keywords

Health education, memory, memory disorders

GLOBALLY, THE proportion of people aged 65 or older is projected to increase from 6.9 per cent of the population in 2000 to 19.3 per cent in 2050 (Gavrilov and Heuveline 2003). Older adults are healthier than in the past but age continues to be associated with development of chronic illness (Slaets 2006). Research supports that increasing age is a risk factor for deterioration in memory and other areas of cognition (Craik and Salthouse 2008). Complaints about poor memory are common in very old people, with 50-80 per cent reporting subjective memory complaints (Stine-Morrow et al 2008). Most older adults age successfully and remain in good health, even with some associated cognitive declines. However, nurses working with older adults should incorporate into practice evidence-based information about the benefits of maintaining brain health.

Knowledge of cognitive neuroscience has increased with a surge in worldwide research, including cross-sectional and longitudinal studies that have investigated changes in cognitive function associated with ageing. Scientists agree that the challenge is to understand the factors that contribute to maintaining a healthy brain. Evidence supports the benefits that lifestyle changes can have for brain health over time, however, the research is controversial because not all older adults can alter their cognitive outcomes (Deary et al 2009).

This article highlights the scientific information about improving cognitive wellbeing and factors that may help older adults to maintain cognitive vitality. Evidence-based nursing implications to assist older adults in navigating complex health information to develop healthy lifestyle behaviours are discussed (Vance et al 2008, Williams and Kemper 2010).

The ageing brain

Maintaining a healthy, optimally functioning brain is essential to a high quality of life (Solfrizzi et al 2008). The brain undergoes physical changes with advancing age. Beginning at about the age of 30 and continuing throughout adulthood, the brain experiences a gradual reduction in weight and volume of about 2 per cent a decade (Raz et al 2005). The decline that begins in early adulthood continues at about the same pace throughout one’s lifetime, with the cumulative effects usually not being noticed until older age.

Brain shrinkage was originally attributed to the loss of neurons, with some studies estimating that adults lose as many as 100,000 neurons a day (Perl 2010). However, brain imaging techniques have revealed the actual loss of neurons is less significant (Reuter-lorenz and Lustig 2005). As we age some brain cells are lost and the brain does shrink in size, but the process is not uniform. Instead, research attributes the reduction in brain volume to the neurons themselves shrinking in size, thereby making them less effective messengers (Jonides et al 2008). Certain brain structures are more prone to shrinkage: the frontal lobes and the hippocampus, two of the primary structures involved in memory. This loss in brain volume can lead to functional impairment in older adults (Driscoll et al 2009) and underscores the importance of nurses’ role in educating older adults about preserving a healthy brain.

Neuroplasticity

Communication occurs in the brain through neurons and neurotransmitters. As we age, the brain’s network of communication declines and is
disrupted by disease processes, disuse and injury. These changes may be responsible for some of the cognitive diminution associated with age. Cognitive changes may also be the result of lost connections, failure to establish new connections and decreases in the levels of two critical neurotransmitters, acetylcholine and dopamine, that are thought to decline with age (Raz et al 2007). Acetylcholine is an essential chemical messenger that ensures neuronal and muscle functioning. Dopamine is necessary for normal brain function and losses lead to declines in cognition, mood and motor control.

The brain is a dynamic structure that has a great capacity for adaptation and repair (Reuter-lorenz and Lustig 2005). The term ‘plasticity’ refers to the ability of the brain to modify its organisation and function, a capability that continues throughout life (Lustig et al 2009). A certain amount of redundancy occurs in the brain that provides a safeguard against damage or loss. This protective mechanism enables another set of connections to take over the function of the surrounding neurons and may initiate the development of new connections to take the place of the lost ones (Nithianantharajah and Hannan 2009).

Research investigating neuronal functioning has shown that the brain positively responds to some forms of mental stimulation and an environment that is rich in cues promoting social function and communication, self-care, mobility and positive affective responses (Day et al 2000). There is reason to believe the brain has some capacity to respond to age-related changes through by creating new neural pathways. Research supports the hypothesis that older adults can benefit from several cognitive and behavioural strategies to enhance the brain’s natural capacity for plasticity and which may forestall cognitive declines (Whalley et al 2004, Greenwood and Parasuraman 2010).

Diet
Research supports that a brain-healthy diet is one that reduces the risk of heart disease and diabetes, boosts blood flow to the brain and is low in fat and cholesterol (Solfrizzi et al 2011a, 2011b). Several research investigations support that consuming certain foods may protect brain cells and older adults have been shown to benefit from these neuroprotective behaviours. Adopting a diet low in processed foods and rich in fruits, vegetables and monounsaturated fats has been shown to reduce the risk of cognitive decline among older adults (Solfrizzi et al 2008, Féart et al 2009).

The traditional Mediterranean diet can be implemented to enhance brain health. This method of living and eating has been extensively studied and is one way to increase the intake of known beneficial nutrients like omega-3 fatty acids, monounsaturated fats and phytonutrients derived from fruits, vegetables and some nuts, specifically walnuts (Féart et al 2009, Scarmeas et al 2009). The characteristics of the Mediterranean diet encourage a healthy eating pattern that includes high consumption of fruits, vegetables, bread and other cereals, potatoes, beans, nuts and seeds. Olive oil, an important source of monounsaturated fat, is consumed daily. Dairy products, fish and poultry are consumed in low to moderate amounts, and little red meat is eaten. The diet encourages eggs to be consumed four times a week and wine in low to moderate amounts.

There is evidence that the aged brain is more prone to events associated with neuroinflammatory processes and that oxidative damage in the brain may lead to cognitive impairments (Head 2009). Antioxidants have been shown to decrease inflammation and slow the ageing process that occurs in the brain. Fruits and vegetables are a source of naturally occurring antioxidants. High levels of this compound can be found in vegetables such as kale, spinach, Brussels sprouts, alfalfa sprouts, broccoli, beets, red bell pepper, onion, corn and aubergine. Dark-skinned fruits with high antioxidant content include prunes, raisins, blueberries, blackberries, strawberries, raspberries, plums, oranges, red grapes and cherries.

Whole berries contain anthocyanosides, a compound proven to prevent harm from free radicals in the brain and slow down oxidative stress; one cup a day is recommended (Borek 2006). Consuming more fruits and vegetables is associated with a decreased occurrence of dementia and Alzheimer’s disease (Féart et al 2009). In a study involving older women, those who ate the most green, leafy and cruciferous vegetables had the mental functioning of people one to two years younger compared with those who ate few of these vegetables (Nelson et al 2009).

Fish high in omega-3 fatty acids has also been shown to benefit brain health. Cold water fish offering beneficial levels of omega-3 fatty acids include halibut, mackerel, salmon, trout and tuna. Wild salmon is preferred over farmed because it tends to have low toxicity levels and often costs less than other beneficial fish. Nuts also contribute a fair share of omega-3 fatty acids and monounsaturated oil (Meydani 2001, Borek 2006).
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Gerontological nurses can highlight the benefits of adapting healthy dietary behaviours. Incorporating information related to healthy practices into the clinical encounter can encourage cognitive health, and promote successful ageing, thereby potentially reducing the burden on the social and healthcare systems.

Exercise
Research suggests that exercise could have benefits for overall health and cognitive function, particularly in later life (Baker et al 2010). Researchers investigating the role of physical activity and cognitive health have found that moderate physical activity, such as brisk walking, swimming or yoga in midlife or later may reduce the risk of developing mild cognitive impairment (Solfrizzi et al 2008, Laditka et al 2009).

In a study investigating the benefit of exercise in a group of older adults, researchers found that moderate exercise was associated with a reduced risk of mild cognitive impairment (Geda et al 2010). Nurses working with older adults can integrate exercise programmes into treatment plans with other healthcare professionals in a variety of settings, including assisted living and long-term care facilities. Hospital-based nurses can develop community-based programmes through churches and adult senior centres targeting independent seniors.

Social engagement
Participation in leisure activities is associated with a reduced risk of dementia (Fritsch et al 2007). Cognitive health may be promoted in older adults who are socially connected, emotionally fulfilled and participate in daily to weekly mental, social or productive activities (Vance and Wright 2009, Vance et al 2010). However, the evidence is conflicting (Brown et al 2010) and further work is required.

Social engagement appears to boost people's sense of control, which reduces stress (Savica and Petersen 2011). Encouraging people to get involved in creative activities, such as singing in a choir, can be a good way to increase social engagement. Poor social connections, infrequent participation in social activities and social disengagement have been shown to predict the risk of cognitive decline related to depression in older adults (Fritsch et al 2007).

Based on evidence of the protective effects of social involvement and productive activities on cognition in ageing, nurses should encourage older adults to become involved in activities they find stimulating (Williams and Kemper 2010).

Cognitive stimulation
Maintenance of cognitive capacity is an important factor in preserving mental health (Stine-Morrow et al 2008). Brain fitness programmes and games have been shown to benefit cognitive functioning among older adults, and engaging in activities that challenge the brain helps to promote brain plasticity (Lustig et al 2009). Evidence suggests that games that challenge the brain such as sudoku, crossword puzzles and some computer-based games can improve the brain's speed and memory (Vance et al 2009). The best activities for sustaining brain health are those that focus on logic, problem-solving skills and analytical mathematics (George and Whitehouse 2011).

Older adults who participate in mental exercise can promote cognitive vitality by stimulating and improving cognitive function in a variety of brain areas. These mental workouts can range from simple childhood games to strategic games such as chess, draughts, bridge and pinochle. Scrabble and crossword puzzles help to stimulate the language and intellect centres of the brain (Cook 2007). Other brain exercises include reading and maths exercises and simple, routine activities such as checking bank statements. When selecting an activity that targets brain health, older adults should choose something that is different and will therefore help to stimulate the development of new neural connections.

Building new brain connections also requires engaging in novel learning behaviours. Researchers investigating cognition and ageing have established that challenging our brains by engaging in behaviours that require learning something new or changing the routine way in which we normally carry out a task helps to develop neuronal pathways (Lustig et al 2009). Older adults who learn to play piano or speak a foreign language form new connections, changing the internal structure of the existing synapses (Gaser and Schlaug 2003). Other ways to help promote the formation of new brain connections include simple changes to everyday routine activities, such as brushing hair or teeth with the non-dominant hand and choosing a different route to the grocery store.
Implications for practice
Ageing is associated with some decline in different forms of cognitive functioning that may contribute to increased dependence in routine activities, such as medication adherence for people with memory loss (Féart et al. 2009). Gerontological nurses can assist older adults to maintain and improve memory through education and promotion of the healthy brain behaviours outlined in this article. The role of nurse educator is vital in health promotion. Nurses have the ability to raise awareness and promote health literacy among older adults by fostering a better understanding of what help is available to improve and maintain cognitive health. As educators, nurses have the unique role of motivating and engaging older adults through feedback that can develop and strengthen their willingness to participate in healthy lifestyle behaviours. Improving general cognitive function can be enhanced by educating patients about the benefits of eating healthily and engaging in regular mental and physical activity. Nurses can look to evidence-based practices that have been shown to improve cognitive functioning such as weekly aerobic activities (Angevaren et al. 2008).

Memory training classes have demonstrated that older people, like young adults, can improve their performance on cognitive tasks including perceptual discrimination, visual search, recognition, recall and spatial perception (Kramer et al. 2004).

Poor nutrition is a critical factor that has been shown to contribute to cognitive decline (Scott et al. 2006). Nurses can use their expertise to evaluate nutritional intake and encourage positive choices that may improve cognitive functioning.

Nurses working with older adults are uniquely positioned in the role of educator because of their direct contact with patients. Understanding the benefits of adapting a brain-health lifestyle and communicating this information to patients in a range of ways may ultimately contribute to more adaptive ageing, one which can assist older people to live a healthy life.

References

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