Advancing practice in the care of people with dementia

4th Edition

Module 2:
Risk factors and reducing the risk

Dementia Training Australia

Contents

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Introduction

This module describes the known risk factors for dementia and discusses risk mitigation strategies.

Primary prevention of disease and illness is fundamental in our pursuit of wellness. Increasing age is the strongest known risk factor for cognitive decline and dementia (WHO, 2019a). The World Health Organisation states healthy ageing is

> *"about creating the environments and opportunities that enable people to be and do what they value throughout their lives"*

(WHO, 2019b).

Findings from an Australian study (Hardy, Oprescu, Millear & Summers, 2018) found healthy ageing was defined as being able to lead productive, independent and autonomous lives in ageing.

The greatest known risk factors for dementia are increasing age, family history, and genetic susceptibility (Baumgart et al, 2015). Familial forms of Alzheimer's Disease (AD) have been linked to mutations in three genes. However, this form of AD is rare and only accounts for a small number of dementia cases (Bratosiewicz-Wasik et al, 2018). Another gene known as ApoE e4 is associated with AD (Bratosiewicz-Wasik et al, 2018).

To prevent dementia, an understanding of the cause and contributing factors is necessary. In most cases there are not known factors that can be said to cause dementia. The exception is a very small group with a specific genetic makeup. The evidence reveals that causation of dementia more likely depends on an accumulation of factors in any one person. Factors that contribute to the likelihood of an individual developing dementia have been identified; these fall into the categories of genetic and lifestyle risk. This module will explore risk factors for dementia and discuss strategies to address these, as well as focus on issues to take into consideration when introducing discussion about risk in health care practice.

Objectives

On completion of this module you will be able to:

- Outline the risk factors for developing dementia
- Describe strategies to minimise risk factors
- Debate issues about introducing discussion of risks for dementia to clinical practice

Module topics

Risk factors – known and implicated

Reducing the impact of identified risks

Considerations in offering information about risk

Current controversies and issues

Summary

References
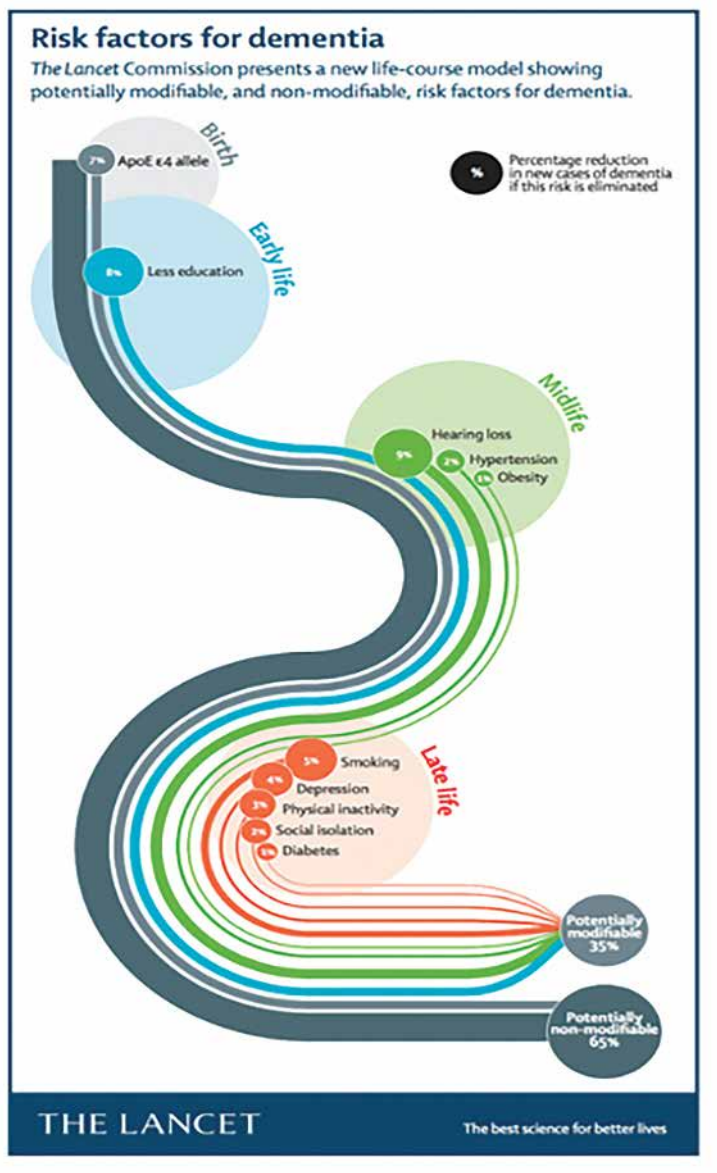
Suggested reading for this module

Anstey, K. & Peters, R. (2019). Dementia Prevention. NHMRC Partnership Centre for Dealing with Cognitive and Related Functional Decline in Older People. https://cdpcsydney. edu.au/research/care-service-pathways/

Livingston, G. Sommerland, A. Orgeta, V. Costafreda, S. Huntley, J. Ames. D. ... Mukadeam, N. (2017). Dementia prevention, intervention, and care. The Lancet Commissions. Vol 390. Pp 2673-2734. https://els-jbs-prod-cdn.literatumonline.com/pb/assets/raw/Lancet/ infographics/dementia-2017/dementia_infog_1000w-1500452767950.jpg

World Health Organisation. (2019). Risk reduction of cognitive decline and dementia. Geneva. WHO. https://www.who.int/publications-detail/risk-reduction-of-cognitive-decline-and-dementia

Risk factors known and implicated

Risk factors for the development of dementia can be described as either modifiable or non-modifiable. Modifiable implies the person can make lifestyle changes as an example of a way to reduce their future risk of developing dementia. Non-modifiable risk factors are factors unique to each person that cannot be changed, thus the risk remains regardless of lifestyle changes.

The infographic from the Lancet Commissions (Livingston et al, 2017) opposite summarises non-modifiable and non-modifiable risks across the lifespan.

Non-modifiable risk factors

Age

Age is the greatest risk for developing dementia. In Module 1, the Australian demographic, reflecting most other countries that enjoy life longevity, clearly shows that as we age the risk of developing dementia increases. However, there are still many people who do not develop dementia despite living to record-breaking ages. This indicates probable potential to delay, or maybe even eradicate, the onset of dementia if other risks are identified and eliminated.

Gender

Gender is an important factor when considering the risk of developing dementia in later life. In people aged over 65 years the probability of developing AD is two to three times higher in women. Women develop hippocampal atrophy and neurofibrillary tangles more rapidly than men. There is some debate as to whether the higher incidence is women is related to women generally living longer. There is also some discussion regarding the role of oestrogen (Qin et al, 2019).

Other factors to consider are gender differences regarding psychosocial and cultural societal norms. These can impact on educational opportunities, physical activity, and occupation, and therefore, increase the risk of developing dementia (Mielke, Vemuri & Rocca, 2014).

Researchers agree further study regarding gender differences is required.

Genetics

Much of the research about dementia and risk has focused on Alzheimer's disease (AD). There is still much to learn about the genetic basis of dementia.

Genes identified in the aetiology of Alzheimer's disease fall into two groups: autosomal dominant or susceptibility genes. Early onset AD (less than 65 years of age) is related to autosomal dominant genes, and has been linked to variants in APP, PSEN1, and PSEN2 genes. These are considered rare and account for only 1-5% of all cases (Hagenaars et al, 2018). Late onset AD is genetically related to the ApoE e4 allele. However, research suggests late onset AD is genetically quite complex. It possibly involves concurrent mutations in multiple genes and interactions among these susceptibility genes with each other; as well as environmental interactions (Hinds & Geschwind, 2017).

ApoE (apolipoprotein E) has three isoforms encoded by three alleles. ApoE's main function is to clear lipoproteins, it is also involved in synaptic plasticity, cell signaling, lipid transport and metabolism, and neuroinflammation in the central nervous system. The presence of the ApoE e4 allele has been identified as a genetic risk for AD. ApoE e4 leads to greater deposition of amyloid-B proteins in the brain, these are the proteins that contribute to the formation of plaques. Conversely, the ApoE e2 allele appears to be protective against AD, this allele seems to prevent amyloid-B protein deposition (Bratosiewicz-Wasik et al, 2018). Lin et al (2018) found ApoE e4 had the most impact on astrocytes and microglia regarding clearance of amyloid-B, and other lipid metabolic abnormalities.

Having susceptibility gene(s) predisposes a person to developing AD, however, a variety of factors appear to attenuate this predisposition such as protective lifestyle behaviours. Having one copy of the APOE e4 allele increases risk for AD three times, while having two copies increases risk fifteen times (Hinds & Geschwind, 2017). Other susceptibility genes have a much smaller impact on risk. More than 20 disease associated susceptibility genes have been identified in AD (Pasanen et al, 2018).

Frontotemporal dementia (FTD) presents with a positive family history in approximately 40% of cases. In FTD the most common mutations found to date are in the MAPT and GRN genes (Hagenaars et al, 2018).

Lewy Body dementia (LBD) is generally a later onset and more sporadic. Research to date does not support a major genetic aetiology. Some studies have found gene mutations in people with LBD that are also implicated in Parkinson's disease and AD. The gene known as SNCA has been shown to have rare mutations associated with LBD (Hinds & Geschwind, 2017).

Rarer types of neurodegeneration are caused by prion disease. This is also known as Creutzfeldt-Jacob disease. Prion disease can be classified as sporadic, acquired or genetic. The genetic variation is associated with mutations in PRNP (Hinds & Geschwind, 2017).

The ApoE e4 allele has already been identified as a genetic risk factor for AD. However, it is known that ApoE also affects risk for cardiovascular disease and stroke. People with the ApoE e4 allele have the highest risk of coronary artery disease and myocardial infarction. Those with the ApoE e2 allele have the least risk, while those with ApoE e3 have a medium risk. People carrying the ApoE e4 allele are 30% more likely to have an ischaemic stroke. Researchers suspect the ApoE e4 allele is also a risk factor for vascular dementia (VAD) (Belloy, Napolioni & Greicius, 2019).

CADASIL and FCAA are very rare versions of VAD that are caused by an autosomal dominant mutation (Ferencz & Gerritsen, 2015).

People with a genetic predisposition to vascular disease will also show a predisposition to vascular dementia. Therefore, any behaviour that protects the integrity of the vascular system, thus preventing infarcts, will be beneficial to reducing the incidence of this type of dementia. Many dementias are of a mixed variety, and vascular disease can exacerbate dementia whose primary cause is Alzheimer's disease or another brain disease. Reducing vascular risk factors will also reduce the incidence of other dementias. A healthy lifestyle is likely to reduce the incidence or delay the onset of dementia.

ACTIVITY	*Consider how would you respond to a client/family member who came to you to ask about their risk of developing dementia when they have a maternal and paternal grandparent with dementia?*
	Dementia Australia (2016) provides a help sheet summarising the evidence on the genetics of dementia. This can be a useful tool to use in guiding your discussions with families who would like to know more about familial dementia or genetic risk.
	https://www.dementia.org.au/files/helpsheets/Helpsheet-AboutDementia10-GeneticsOfDementia_english.pdf

Lifestyle

Research indicates that there are nine major risk factors contributing to the development of dementia. In combination, these nine risk factors appear to contribute to approximately 35% of all dementia cases. Conversely, elimination of the ApoE e4 allele would only reduce the incidence of dementia by approximately 7% (Livingston et al, 2017).

The nine risk factors identified by Livingstone et al (2017) are:

- Education to a maximum age of 11-12 years (8%)
- Midlife hypertension (2%)
- Midlife obesity (1%)
- Hearing loss (9%)

- Late life depression (4%) Recent research considers this risk factor to be debateable – more discussion later in this Module.
- Diabetes (1%)
- Physical inactivity (3%)
- Smoking (5%)
- Social isolation (2%)

Figures in brackets indicate the attributable percentage contributing to the risk of developing dementia.

Education

Higher levels of education are associated with a lower incidence of dementia (Baumgart et al, 2015). The relevant hypothesis here is that of cognitive reserve – researchers believe more education increases cognitive reserve and thus allow the person to delay the impact of cognitive decline (Qin et al, 2019). Underwood (2014) describes this a the 'water tank' hypothesis: the better off your brain is when young, the better your brain can resist neurodegeneration. Or more simply: the higher the level in the tank, the longer it takes to run out.

The 'Nun Study' is a well-known longitudinal study conducted on 678 nuns from the Sisters of Notre Dame in Maryland, United States. Snowden (1997) describes Sister Mary – one of the study participants. Sister Mary had only eight years of formal education initially. However, as she started a lengthy career in education, she continued to study over a 22-year period. Sister Mary taught full-time until the age of 77 years but did not fully retire until the age of 84 years. Cognitive testing was performed on Sister Mary when she was 101 years-old. Her results were well within the normal range. Sister Mary died a year later. Nursing reports and interviews with her peers indicated stable cognitive function and a 'clear mind'. After death Sister Mary's brain was examined. Her brain was of a low weight with no evidence of infarction. There was an abundance of Alzheimer's disease lesions: neurofibrillary tangles and senile plaques. Snowden (1997) suggests Sister Mary remained cognitively intact despite the neuropathology because of her superior cognitive ability.

Further information can be found at: https://www.youtube.com/watch?v=xvtUv9dFS2g

Vascular risk factors

These include hypertension, diabetes and obesity.

A British longitudinal study conducted over a 28-year timeframe found midlife obesity (at the age of 50 years) is a risk factor for the future development of dementia (Singh-Manoux et al, 2018). A further study of 1.3 million adults from Europe, the United States and Asia by Kivimaki et al (2018) confirmed these findings for a midlife obesity risk. However, they also found a diminished risk of dementia in people with a high BMI in later life. It appears people with a pre-clinical dementia may begin to lose weight. Unplanned weight loss in older people is a cause for concern. Further research is required to see if planned weight loss in mid-life reduces dementia risk. Another factor is the difficulty of separating obesity

from related cardiovascular risk factors such as hypertension and diabetes (Pedditzi, Peters & Beckett, 2016).

Evidence related to diet is limited and contradictory. There is some suggestion that a Mediterranean style diet or a diet modelled on DASH (Dietary Approaches to Stop Hypertension) may assist with reducing the risk of developing dementia (Baumgart et al, 2015).

A study in Norway found a relationship between high blood glucose levels in middle-aged people and the risk of dementia related death up to four decades later (Rosness, Engedal, Bjertness & Strand, 2016). Insulin anomalies are thought to decrease brain insulin production. This then impairs amyloid clearance (Livingstone et al, 2017).

Hypertension and high blood glucose levels are associated with accelerated rates of brain atrophy (Ritchie et al, 2017).

Hearing loss

Several studies demonstrate a link between hearing loss in mid-life with cognitive decline and dementia. The reason why is unclear. It is not known if hearing correction aids can prevent or delay the development of dementia. It is postulated that hearing loss may have a mechanism of increased cognitive load, or social disengagement, or accelerated atrophy (Livingston et al, 2017).

Physical inactivity

Physical fitness is related to healthy brain ageing (Ritchie et al, 2017). Aerobic exercise has been shown to prevent left hippocampal age-related decline and maintain neuronal health (Firth et al, 2018). A longitudinal study conducted on women in Sweden found physical activity in mid-life was associated with a reduced risk of dementia (Najar et al, 2019). Mortimer and Stern (2019) found aerobic exercise increased levels of brain-derived neurotrophic factor (BDNF) as well as increased hippocampal volume. It is believed BDNF slows cognitive decline. Other studies support a relationship between physical exercise and neurogenesis, neuroprotection, and reduced cognitive function (Alwardat et al, 2019; Ma et al, 2017). The evidence supports consistent and regular physical activity. However, it is still to be determined what type of activity, for how long and to what intensity would be most protective for preventing the development of dementia (Baumgart et al, 2015).

Smoking

Healthy ageing is associated with being a non-smoker at the mid-life point (Franzon, Zethelius, Cederholm & Kilander, 2015). There is some suggestion that the reason smoking is a risk factor for dementia is the link with cardiovascular health. However, it has also been suggested part of the risk is related to neurotoxins contained within cigarettes (Livingston et al, 2017). One research study found that people who smoked heavily in mid-life had a two-fold risk of developing dementia in later life (Baumgart et al, 2015).

Social Isolation

There is a link between being single as an older person and cognitive decline. Marriage or partnership appears to contribute to a more favourable cognitive state. It appears an ongoing relationship between two people provides for more communication, this is thought to stimulate neurons and protect from cognitive degeneration (Qin et al, 2019). A study by Holwerda et al (2014) looked at both social isolation and feelings of loneliness and the link with dementia. This study found the risk of developing dementia was significantly higher in people who expressed feelings of loneliness. This suggests that we need to consider people's social situation as more than just the objective fact; we also need to consider their perception of their situation.

Depression

Neuropsychiatric symptoms such as depression are common in people living with dementia, up to 50% of people with a diagnosis of dementia have depression as a co-morbidity (Singh-Manoux et al, 2018). Thus, there has been a link between depression in later life and dementia. The relationship between depression and dementia does not vary between different types of dementia (Cherbuin, Kim & Anstey, 2016). A British study known as the Whitehall II cohort was conducted on over 10,000 people over a 28-year period (Singh-Manoux et al, 2018). This study demonstrated there is no link between depressive symptoms at mid-life and later dementia diagnoses. This study postulated that depressive symptoms in later life are instead a prodromal feature of dementia. These symptoms may appear up to a decade before dementia is diagnosed (Singh-Manoux, 2018; Borenstein & Mortimer, 2016).

Care needs to be taken in assuming depression is a risk factor for developing dementia. It is starting to appear that it is in fact either prodromal or shares common causes with dementia.

Other risk factors

Traumatic brain injury (TBI) or Chronic traumatic encephalopathy (CTE)

There is a recognised risk of developing dementia following a traumatic brain injury. Chronic traumatic encephalopathy is a neurodegenerative condition thought to develop as a result of repetitive head trauma, including concussive and sub-concussive injuries (Hasoon, 2017). A Danish study confirmed this risk when comparing people with a history of TBI and those with either no history of TBI or non-TBI trauma (Fann et al, 2018). Studies conducted with both American and British footballers have found links between CTE related to earlier participation in football and later development of dementia (Ling et al, 2017; Mez et al, 2017). However, it is not only a risk in sports people who have sustained multiple concussive injuries. Military personnel are also at risk due to exposure to blast related TBIs (Hasson, 2017).

Alcohol intake

It is well recognised that excessive alcohol intake is a significant risk factor for several chronic diseases and mortality. With respect to the risk of dementia the relationship with alcohol intake is complex. The relationship is often described as either J or U shaped. That is, the

risk of developing dementia is higher for people who abstain from alcohol and those who are heavy consumers of alcohol. People described as light to moderate drinkers seem to have a lower risk of developing dementia (Sabia et al, 2018). There are several confounding factors here: it is difficult to consistently define alcohol intake across populations; light to moderate drinkers may share protective sociodemographic factors, abstainers may include people who were previously heavy drinkers or who have other co-morbid risk factors for developing dementia (Anstey & Peters, 2018). Another factor is the postulated protective mechanisms of light to moderate alcohol consumption with cardiometabolic disease (Yasar, 2018). However, there may be some potential risks directly attributable to alcohol. These include neurotoxic effects of ethanol and metabolites; thiamine deficiency; hepatic encephalopathy, increased risk of head injury; and increased risk of poor lifestyle associated with heavy alcohol consumption (Ballard and Lang, 2018). A longitudinal Swedish study found that there is an increased risk of dementia associated with heavy and very heavy drinking, even when sociodemographic, lifestyle and cardiovascular factors are accounted for (Handing, Andel, Kadlecova, Gatz & Pedersen, 2015).

Stress and Anxiety

A person's perceptions of stress appear to increase the risk of developing dementia. A Danish study found a relationship between the level of perceived stress at the mid-life point and the incidence of dementia in late life. This study notes individual responses are likely to modify perception of stress; these include personality, resilience, coping strategies, and social support (Nabe-Nielson et al, 2019).

Anxiety and post-traumatic stress disorder (PTSD) are also both associated with the development of dementia in later life. This is especially noted in military personnel and is seen in both men and women from the defence forces (Schneider & Ling, 2019). A recent meta-analysis and systematic review found the relationship between anxiety or PTSD and dementia to be unclear. Further research using longitudinal data is required to clarify this point (Kuring, Mathias & Ward, 2018).

Sleep disturbances

Sleep disturbances and dementia are both common health concerns in older people. There has been a suspicion that sleep disturbances may be another risk factor for the development of dementia. A systematic review found a relationship between reported sleep disturbances and the later development of dementia (Shi et al, 2018). However, this review acknowledged that the sleep disturbances were based on self-report and there may have been other confounding factors. A more recent study has found sleep duration and quality are associated with amyloid-B levels (Wu, Dunnett, Ho & Chang, 2019). This study found that both sleep disturbances and circadian rhythm disruption are likely to be risk factors for the later development of Alzheimer's disease.

Further research is required. However, it seems likely that part of any dementia prevention program would include strategies to improve sleep quality and reduce circadian rhythm disruption.

No-one welcomes the possibility that they will experience dementia. In fact, dementia is well-placed within the top 10 health conditions that people fear they may develop.

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Consider the following 10 conditions:

- *Ischaemic heart disease*
- *Stroke*
- *Lower respiratory tract infections*
- *Chronic obstructive pulmonary disease (COPD)*
- *Cancer of the trachea, bronchus and lungs*
- *Diabetes mellitus*
- *Alzheimer's disease and other dementias*
- *Dehydration related to diarrhoea*
- *Tuberculosis*
- *Cirrhosis of the liver*

Without thinking too much about it, order these from 1 to 10 based on the most feared to the least feared. You will probably consider personal factors that impact on what you believe your risk might be.

These conditions are rated as the top 10 deadliest conditions in the world: https://www.healthline.com/health/top-10-deadliest-diseases

Now reflect on and explain why you have ordered the conditions in the way you have.

Compare these to the top 10 global causes of death in 2019 according to the World Health Organisation (2018): https://www.who.int/en/news-room/fact-sheets/detail/the-top-10-causes-of-death

- Ischaemic heart disease
- Stroke
- COPD
- Lower respiratory tract infections
- Alzheimer's disease and other dementias
- Cancer of the trachea, bronchus and lungs
- Diabetes mellitus
- Road injury
- Diarrhoea
- Tuberculosis

This list introduces road injury as a significant cause of death, look back at your first list. Where would you rate road injury as a personal fear?

Generally, assessment of risk will be based to some degree on the fears you hold. However, these fears are based on many other things; for example, stigma, previous experience of the condition in family members or friends, context of the risk and belief systems held, such as whether good health is within personal control or not. The experience of symptoms

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**ACTIVITY
(Continued)**

Scroll down the page and look at the breakdown of causes of death according to country income levels. You may notice Alzheimer's disease and other dementias does not feature in the top 10 causes of death in lower income countries. However, it becomes a more common cause of death in more affluent countries. Reflect on leading causes of death in Australia: where does dementia rate in this country?

For the clinician, interpreting risk comes with important considerations:

- What does the client need to know?
- What does the client want to know?
- How is the client going to understand or use risk information offered?
- Is the information offered going to add more burden to the 'worried well' in our community?
- What is the best way to offer information about risk?

Researchers believe it is beginning to be possible to identify predictive models for dementia. These models are using cognitive testing, APOE e4 genotyping, and brain MRI parameters (Licher et al, 2019). It is a fundamental role for health professionals to communicate effectively about risk when interacting with clients and families. This allows for informed decision making (Stevenson &Taylor, 2017).

Do people want to know about personal dementia risk?

A study exploring public views on identifying risks of dementia and early diagnosis highlighted ethical issues, as well as both potential benefits and limitations. The study found people preferred a model that embedded dementia risk assessment within routine health checks that focused on a healthier lifestyle, rather than specifically on dementia (Robinson et al, 2018).

Information is often gathered from public sources such as the internet. People using social media most commonly look for information or advice about dementia risk factors, screening, and prevention (Lawless, Agoustinos & LeCouteur, 2018a). Nonprofit dementia organisations that are active online tend to position the population as everybody potentially being at risk of dementia. This then makes participation in prevention activities appear more relevant to people (Lawless, Augoustinos & LeCouteur, 2018b).

There is still much to be learnt about the risk factors for dementia

If one was to test positive for the ApoE ?4 allele, what then?

People who have concerns about developing dementia need to be encouraged to voice their concerns and have these addressed considering the evidence and what can be done, and the uncertainty that exists in relation to these concerns.

Reducing the risk

When approaching a preventative strategy for dementia it appears that what happens at mid-life is very important. It is at this point that several lifestyle factors may be contributing to risk of later disease. This is true for cardiovascular disease and cancer as well as dementia or other chronic conditions. Improving lifestyle at the mid-life point is likely to have several positive health outcomes for individuals.

Reconsider the suggested readings from the beginning of this module. All three documents make recommendations based on current evidence. The document from the World Health Organisation (WHO) (2019) also comments on the strength of the supporting evidence. You can see these is always a need for ongoing research in these areas to strengthen recommendations.

Current recommendations include:

Physical activity
- How much is the right amount?
- What type of exercise?
- Recommendations need to be individualised according to the person
- The Australian Government Department of Health has physical activity guidelines. The guidelines for adults and older adults are most relevant for this topic and can be found here: https://www1.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-strateg-phys-act-guidelines

Stop smoking
- Advice on smoking cessation is available here from the Australian Government: https://www.health.gov.au/health-topics/smoking-and-tobacco/how-to-quit-smoking
- Another useful resource is from the Victorian Government: https://www.quit.org.au/

Nutrition

A Mediterranean style diet is recommended.

Reduce problematic alcohol consumption

Useful information can be found at Health Direct (2017): https://www.healthdirect.gov.au/managing-your-alcohol-intake

Cognitive engagement
- The evidence for this strategy is currently low. However, it is a strategy that may give people enjoyment and is unlikely to cause harm. The key here is to not force people to undertake disliked activities.

Social activity

This is an overall recommendation for good health. Social participation and social support are important.

Maintain a normal BMI

The Australian Government Department of Health provides a resource that may be of assistance: http://healthyweight.health.gov.au/wps/portal/Home/home/!ut/p/a1/04_Sj9CPykssy0xPLMnMz0vMAfGjzOl9jFxdDY1MDD3dzbycDTzNLfwsfP2AAsbGQAWRQAUGOICjASH94fpRYCXO7o4eJuY-QD0mFkYGni5OHi7mlr4GBp5mUAV4rCjIjTDIdFRUBADr1DFv/dl5/d5/L2dBISEvZ0FBIS9nQSEh/

Manage hypertension

Resources to assist with recognising and managing hypertension can be found at the Heart Foundation: https://www.heartfoundation.org.au/for-professionals/clinical-information/hypertension

Manage diabetes mellitus

Many resources are available from Diabetes Australia: https://www.diabetesaustralia.com.au/

Manage dyslipidaemia

High cholesterol needs to be managed as per cardiovascular guidelines. There is no evidence statins increase the risk of dementia (Samaras et al, 2019).

Optimise healthy sleep patterns
- Advice is available from the Victorian Government Better Health Channel: https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/sleep-hygiene
- More serious cases may require a referral to a specialist sleep clinic

Manage depression

Current research regarding depression considers this to be a prodromal symptom rather that a specific risk factor. Nevertheless, good practice is to treat depressive symptoms as required to promote general good health for the individual

Manage hearing loss
- Current evidence is unclear as to whether hearing aids will reduce the future risk of dementia. However, again, use of hearing aids is recommended as part of general good health and to optimise capacity for social engagement.
- The WHO provide guidelines that can be found in the Integrated Care for Older People (ICOPE) handbook: https://www.who.int/ageing/publications/icope-handbook/en/

Summary

This module has identified several recognised and postulated factors that place an individual at risk of developing dementia and has presented a discussion as to how some of these risk factors might be addressed. This area of investigation continues to develop, and the knowledge base is improving.

The use of low-cost interventions that have other social and health benefits can be supported; these include physical exercise, a healthy diet, mental stimulation and social inclusion. Effective control of cardiovascular risk factors is important.

Occasionally contentious alternative interventions are described in the media. It is important to consider if these therapies are supported by research evidence. People may still decide to make personal lifestyle choices. Ideally there would be a balanced discussion between the person and the clinician.

The role of the clinician is to ensure clients have the information available and make an informed decision.

Resources

Dementia Australia. (2015). *What you drink and eat and your brain.* https://www.dementia.org.au/files/helpsheets/Helpsheet-DementiaQandA07-WhatYouEatAndDrinkAndYourBrain_english.pdf

Dementia Australia. (2015). *Physical exercise and dementia.* https://www.dementia.org.au/files/helpsheets/Helpsheet-DementiaQandA08-PhysicalExercise_english.pdf

Dementia Australia. (2015). *Your brain matters: 5 simple steps.* https://www.dementia.org.au/files/helpsheets/Helpsheet-YourBrainMatters02_5SimpleSteps_english.pdf

Dementia Collaborative Research Centres: *Early Diagnosis and Prevention Centre* http://www.dementiaresearch.org.au/the-centres/8-about-us/226-dcrc-edp.html

References

Alwardat, M. Schirinzi, T. Di Lazzaro, G. Sancesario, G. Franco, D. Imbriani, P. ... Pisani, A. (2019). Association between physical activity and dementia's risk factors in patients with Parkinson's disease. *Journal of Neural Transmission.* *Vol 126.* Pp319-325.

Anstey, K. & Peters, R. (2019). *Dementia Prevention.* NHMRC Partnership Centre for Dealing with Cognitive and Related Functional Decline in Older People. https://cdpcsydney.edu.au/research/care-service-pathways/

Anstey, K. & Peters, R. (2018). Alcohol and dementia – risk or protective factor? *Neurology.* *Vol 14.* Pp 635-636.

Australian Government Department of Health (2020). *Healthy weight guide.* http://healthyweight.health.gov.au/wps/portal/Home/home/!ut/p/a1/04_Sj9CPykssy0xPLMnMz0vMAfGjzOI9jFxdDY1MDD3dzbycDTzNLfwsfP2AAsbGQAWRQAUGOICjASH94fpRYCXO7o4eJuY-QD0mFkYGni5OHi7mlr4GBp5mUAV4rCjIjTDIdFRUBADr1DFv/dl5/d5/L2dBISEvZ0FBIS9nQSEh/

Australian Government Department of Health (2019). *How to quit smoking.* https://www.health.gov.au/health-topics/smoking-and-tobacco/how-to-quit-smoking

Australian Government Department of Health. (2019). *Australia's physical activity and sedentary behaviour guidelines and the Australian 24-hour movement guidelines.* https://www1.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-strateg-phys-act-guidelines

Ballard, C. & Lang, I. (2018). Alcohol and dementia: a complex relationship with potential for dementia prevention. *The Lancet.* *Vol 3.* Pp e103-104.

Baumgart, M. Snyder, H. Carrillo, M. Fazio, S. Kim, H. & Johns, H. (2015). Summary of the evidence on modifiable risk factors for cognitive decline and dementia: A population-based perspective. *Alzheimer's & Dementia. Vol 11*. Pp 718-726.

Belloy, M. Napolioni, V. & Greicius, M. (2019). A quarter century of APOE and Alzheimer's disease: progress to date and the path forward. *Neuron 101*. Pp 820-838.

Better Health Channel. (2014). *Sleep hygiene.* https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/sleep-hygiene

Borenstein, A. & Mortimer, J. (2016). Ch 20: *Prodromal markers of disease or causal risk factors? Depression, olfaction, and subjective memory complaints. Lifecourse Perspectives on Risk Reduction*. Elsevier Science and Technology.

Bratosiewicz-Wasik, J. Liberski, P. Peplonska, B. Styczynska, M. Smolen-Dzirba, J. Cycon, M. & Wasik, T. (2018). Regulatory region single nucleotide polymorphisms of the apoliprotein E gene as risk factors for Alzheimer's disease. *Neuroscience Letters. Vol 684*. Pp 86-90.

Cherbuin, N. Kim, S. & Anstey, K. (2016). *Late-life depression and dementia risk*. 24th European Congress of Psychiatry/ European Psychiatry 33S. pp 290-643.

Dementia Australia. (2016). *Genetics of dementia*. https://www.dementia.org.au/files/helpsheets/Helpsheet-AboutDementia10-GeneticsOfDementia_english.pdf

Diabetes Australia. (2020). https://www.diabetesaustralia.com.au/

Fann, J. Ribe, A. Pederson, H. Fenger-Gron, M. Christensen, J. Benros, M. & Vestergaard, M. (2018). Long-term risk of dementia among people with traumatic brain injury in Denmark: a population-based observational cohort study. *Lancet Psychiatry. Vol 5*. Pp 424-31.

Ferencz, B. & Gerritsen, L. (2015). Genetics and underlying pathology of dementia. *Neuropsychology Review. Vol 25*. Pp 113-124.

Firth, J. Stubbs, B. Vancampfort, D. Schuch, F. Lagopoulos, J. Rosenbaum, S. & Ward, P. (2018). Effect of aerobic exercise on hippocampal volume in humans: a systematic review and meta-analysis. *NeuroImage. Vol 166*. Pp 230-238.

Franzon, K. Zethelius, B. Cederholm, T. & Kilander, L. (2015). Modifiable midlife risk factors, independent aging, and survival in older men: report on long-term follow-up of the Uppsala longitudinal study of adult men cohort. *Journal American Geriatrics Society. Vol* 63(5). Pp 877-885.

Hagenaars, S. Radakovic, R. Crockford, C. Fawns-Ritchie, C. International FTD-Genomics Consortium (IFGC). Harris, S. Gale, C. & Deary, I. (2018). Genetic risk for neurodegenerative disorders, and its overlap with cognitive ability and physical function. *PLOS ONE. Vol 13* (6). Pp 1-13.

Handing, E. Andel, R. Kadlecova, P. Gatz, M. & Pedersen, N. (2015). Midlife alcohol consumption and risk of dementia over 43 years of follow-up: a population-based study from the Swedish twin registry. *Journal of Gerontol A Biol Sci Med Sci. Vol 70*(10). Pp 1248-1254.

Hardy, M. Oprescu, F. Millear, P. & Summers, M. (2018). Let me tell you about healthy ageing and about my quality of life: listening to the baby boomer voice. *Quality in Ageing and Older Adults. Vol 19*(3). Pp 167-179.

Hasoon, J. (2017). Blast-associated traumatic brain injury in the military as a potential trigger for dementia and chronic traumatic encephalopathy. *The Army Medical Department Journal.* Pp 102-105.

Health Direct. (2017). *Managing your alcohol intake.* https://www.healthdirect.gov.au/managing-your-alcohol-intake

Healthline. (2017). *Top 10 deadliest diseases.* https://www.healthline.com/health/top-10-deadliest-diseases

Heart Foundation. (2020). *Hypertension.* https://www.heartfoundation.org.au/for-professionals/clinical-information/hypertension

Hinds, F. & Geschwind, D. (2017). Molecular genetics of neurodegenerative dementias. *Cold Spring Harbor Perspectives in Biology. Vol 17* (9). Pp 1-23.

Holwerda, T. Deeg, D. Beekman, A. Tilburg, T. Stek, M. Jonker, C. & Schoevers, R. (2014). Feelings of loneliness, but not social isolation, predict dementia onset: results from the Amsterdam Study of the Elderly (AMSTEL). *Journal Neurology Neurosugery Psychiatry. Vol 85.* Pp 135-142.

Kivimaki, M. Luukkonen, R. Batty, G. Ferrie, J. Pentti, J. Nyberg, S. … Jokela, M. (2018). *Body mass index and risk of dementia: analysis of individual-level data from 1.3 million individuals. Alzheimer's and Dementia.* Pp 601-609.

Kuring, J. Mathias, J. & Ward, L. (2018). Prevalence of depression, anxiety and PTSD in people with dementia: a systematic review and meta-analysis. *Neuropsychology Review. Vol 28.* Pp 393-416.

Lawless, M. Augoustinos, M. & LeCouteur, A. (2018a). Dementia on Facebook: requesting information and advice about dementia risk-prevention on social media. *Discourse, Context & Media. 25.* Pp 44-51.

Lawless, M. Augoustinos, M. & LeCouteur, A. (2018b). "Your brain matters": issues of risk and responsibility in online dementia prevention information. *Qualitative Health Research. Vol 28*(10). Pp 1539-1551.

Licher, S. Leening, M. Yilmaz, P. Wolters, F. Heeringa, J. Bindels, P. … & Ikram, M. (2019). Development and validation of a dementia risk prediction model in the general population: an analysis of three longitudinal studies. *American Journal of Psychiatry. Vol 176*(7). Pp 543-551.

Lin, Y. Seo, J. Gao, F. Feldman, H. Wen, H. Penney, J. … Tsai, L. (2018). APOE4 causes widespread molecular and cellular alterations associated with Alzheimer's disease phenotypes in human iPSC-derived brain cell types. *Neuron 98.* Pp 1141-1154.

Ling, H. Morris, H. Neal, J. Lees, A. Hardy, J. Holton, J. Revesz, T. & Williams, D. (2017). Mixed pathologies including chronic traumatic encephalopathy account for dementia in retired association football (soccer) players. *Acta Neuropathol. Vol 133.* Pp 337-352.

Livingston, G. Sommerland, A. Orgeta, V. Costafreda, S. Huntley, J. Ames. D. ... Mukadeam, N. (2017). Dementia prevention, intervention, and care. *The Lancet Commissions. Vol 390.* Pp 2673-2734. https://els-jbs-prod-cdn.literatumonline.com/pb/assets/raw/Lancet/infographics/dementia-2017/dementia_infog_1000w-1500452767950.jpg

Ma, C. Ma, X. Wang, J. Liu, H. Chen, Y. & Yang, Y. (2017). Physical exercise induces hippocampal neurogenesis and prevents cognitive decline. *Behavioural Brain Research. Vol 317.* Pp 332-339.

Mez, J. Daneshvar, D. Kiernan, P. Abdolmohammadi, B. Alvarez, V. Huber, B. ... McKee, A. (2017). Clinicopathological evaluation of chronic traumatic encephalopathy in players of American football. *Journal American Medical Association. Vol 318*(4). Pp 360-370.

Mielke, M. Vemuri, P. & Rocca, W. (2014). Clinical epidemiology of Alzheimer's disease: assessing sex and gender differences. *Clinical Epidemiology. Vol 6.* Pp 37-48.

Mortimer, J. & Stern, Y. (2019). Physical exercise and activity may be important in reducing dementia risk at any age. *Neurology. Vol 92.* Pp 362-363.

Nabe-Nielson, K. Rod, N. Hansen, A. Prescott, E. Grynderup, M. Islamoska, S. ... & Westendorp, R. (2019). *Perceived stress and dementia: results from the Copenhagen city heart study. Aging & Mental Health.* DOI: 10.1080/13607863.2019.1625304

Najar, J. Ostling, S. Gudmundsson, P. Sundh, V. Johansson, L. Kern, S. ... & Skoog, I. (2019). Cognitive and physical activity and dementia: a 44-year longitudinal population study of women. *Neurology. Vol 92.* Pp 1322-1330.

Pasanen, P. Myllykangas, L. Poyhonen, M. Kiviharju, A. Siitonen, M. Hardy, J. ... Verkkoniemi-Ahola, A. (2018). Genetics of dementia in a Finnish cohort. *European Journal of Human Genetics. Vol 26.* Pp 827-837.

Pedditzi, E. Peters, R. & Beckett, N. (2016). The risk of overweight/obesity in mid-life and late life for the development of dementia: a systematic review and meta-analysis of longitudinal studies. *Age and Ageing. Vol 45.* Pp 14-21.

Qin, Y. Tian, Y. Han, H. Liu, L. Ge, X. Xue, H. ... the Alzheimer's Disease Neuroimaging Initiative. (2019). Risk classification for conversion from mild cognitive impairment to Alzheimer's disease in primary care. *Psychiatry Research. 278.* Pp 19-26.

Quit Victoria. (2020). https://www.quit.org.au/

Ritchie, S. Tucker-Drob, E. Cox, S. Dickie, D. Hernandez, M. Corley, J. ... & Deary, I. (2017). Risk and protective factors for structural brain ageing in the eighth decade of life. *Brain Structure & Function. Vol 222.* Pp 3477-3490.

Robinson, L. Dickinson, C. Maglara, E. Newton, L. Prato, L. & Bamford, C. (2018). Proactive approaches to identifying dementia and dementia risk: a qualitative study of public attitudes and preferences. *BMJ Open.* 8:e018677. DOI: 10.1136/bmjopen-2017-018677.

Rosness, T. Engedal, K. Bjertness, E. & Strand B. (2016). Association between random measured glucose levels in middle and old age and risk of dementia-related death. *Journal American Geriatric Society. Vol 64.* Pp 156-161.

Sabia, S. Fayosse, A. Dumurgier, J. Dugravot, A. Akbaraly, T. Britton, A. Kivimaki, M. & Singh-Manoux, A. (2018). Alcohol consumption and risk of dementia: 23 year follow-up of Whitehall II cohort study. *British Medical Journal. 362*. Pp 1-11.

Samaras, K. Makkar, S. Crawford, J. Kochan, N. Slavin, M.Wen, W. ... Sachdev, P. (2019). Effects of statins on memory, cognition, and brain volume in the elderly. *Journal of the American College of Cardiology. Vol 74*(21). Pp 2554-2568.

Schepers, O. Kohler, S. Deckers, K. Irving, K. O'Donnell, C. van den Akker, M. ... van Boxtel, M. (2018). Lifestyle for brain health (LIBRA): a new model for dementia prevention. International Journal of Geriatric *Psychiatry. Vol 33*. Pp 167-175.

Schneider, A. & Ling, G. (2019). Associations of TBI, PTSD, and depression with dementia risk among female military veterans. *Neurology. Vol 92*. Pp 117-118.

Shi, L. Chen, S. Ma, M. Bao, Y. Han, Y. Wang, Y. Shi, J. Vitiello, M. & Lu, L. (2018). Sleep disturbances increase the risk of dementia: a systematic review and meta-analysis. *Sleep Medicine Reviews. 40*. Pp 4-16.

Singh-Manoux, A. Dugravot, A. Shipley, M. Brunner, E. Elbaz, A. Sabia, S. & Kivimaki, M. (2018). *Obesity trajectories and risk of dementia: 28 years of follow-up in the Whitehall II study. Alzheimer's and Dementia*. Pp 178-186.

Snowden, D. (1997). Aging and Alzheimer's disease: Lessons from the Nun Study. *The Gerontological Society of America. Vol 37*. Pp 150-156.

Stevenson, M. & Taylor, B. (2017). Risk communication in dementia care: professional perspectives on consequences, likelihood, words and numbers. *British Journal of Social Work. Vol 47*. Pp 1940-1958.

Underwood, E. (2014). Starting young: decades-old IQ test records from Scottish children have opened a unique window on how the brain ages. *Science. Vol 346*. Pp 568-571.

World Health Organisation (2019a). Risk reduction of cognitive decline and dementia. Geneva. WHO. https://www.who.int/publications-detail/risk-reduction-of-cognitive-decline-and-dementia

World Health Organisation. (2019b). *Ageing and Life Course*. https://www.who.int/ageing/healthy-ageing/en/

World Health Organisation. (2019). *Integrated care for older people*. https://www.who.int/ageing/publications/icope-handbook/en/

World Health Organisation. (2018). *Top 10 causes of death*. https://www.who.int/en/news-room/fact-sheets/detail/the-top-10-causes-of-death

Wu, H. Dunnett, S. Ho, Y. Chang, R. (2019). The role of sleep deprivation and circadian rhythm disruption as risk factors of Alzheimer's disease. *Frontiers in Neuroendocrinology. 54*. Pp 1-14.

Yasar, S. (2018). Relation between alcohol consumption in midlife and dementia in late life. *British Medical Journal. 362*. Pp 1-2.