Dementia and cognitive decline

Expert Briefing

Su Ray and Dr Susan Davidson
Research Department

Together, we can help everyone to love later life
Brain basics

‘Normal’ ageing, cognitive impairment and dementia – what’s the difference?
100 billion nerve cells, each with 1,000 connections … avg 100 trillion connections

‘The most complex object in the universe’

Christof Koch, chief scientific officer of the Allen Institute for Brain Science
‘Grey’ matter / ‘White’ matter

- Nerve cells = neurons
- Carry and communicate signals
  - From one part of brain to another
  - Between body and brain
- Shape dictated by function
- ‘White matter’ signals are carried
- ‘Grey matter’ signals are communicated between cells.
‘Normal’ ageing

Source: Seattle Longitudinal Study
Mild cognitive impairment

Some sorts of memory functions that decline with age:
✓ Names of people or places
✓ Misplacing things
✓ Keeping track of a schedule of commitments
✓ Carrying out intended activities
✓ Numbers and passwords
✓ Remembering what was said or decided upon

Noticeable changes
Greater decline than you would expect
Some - treatable (depression, stress, anxiety or medication)
Some - precursor to dementia (one in six)
Affects estimated 5-20 per cent of 65+
Dementia
Types, prevalence, causes, risk and protective factors
Dementia arises from a number of defined diseases

<table>
<thead>
<tr>
<th>Dementia subtype</th>
<th>Early symptoms</th>
<th>Tissue damage</th>
<th>% of dementia cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alzheimer’s Disease</td>
<td>Impaired memory, apathy and depression, gradual onset</td>
<td>Cortical amyloid plaques and neurofibrillary tangles</td>
<td>50-75%</td>
</tr>
<tr>
<td>Vascular Dementia</td>
<td>Similar to AD but memory less affected, mood fluctuations more prominent; physical frailty, stepwise onset</td>
<td>Blood supply to critical regions of brain, or more diffusely.</td>
<td>20-30%</td>
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<tr>
<td>Lewy Body Dementia</td>
<td>Marked fluctuation in cognitive ability; visual hallucinations; Parkinsonism</td>
<td>Cortical Lewy bodies</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>Fronto-temporal Dementia</td>
<td>Personality changes; mood changes; dishibition; language difficulties</td>
<td>No single pathology – damage limited to frontal and temporal lobes</td>
<td>5-10%</td>
</tr>
</tbody>
</table>

Source: Prince et al, 2014
Prevalence – of diagnosed and undiagnosed dementia

Age specific rates in UK

- Total
- Male
- Female
Causes, risk and protective factors

• Genetic inheritance (early onset diseases, extremely rare)
• Mixed genetic and environmental factors (late onset, far more common)
• Controversial - ‘emergent’ evidence from expert consensus…
• ‘Blackfriars Consensus’ – risk factors as for cardio vascular diseases also likely to impact on brain health
• Modifiable risk factors:
  – Smoking
  – Obesity
  – Midlife high blood pressure
  – Cholesterol
  – Diabetes
  – Depression

• ? Stress and anxiety? Sleep disorders?
• ? Cognitive stimulation?
• ? Educational level?
03 Interventions

What can we do to reduce risk, delay onset, and even reverse cognitive decline and dementia?
Experts have reached a consensus of actions we can take to reduce risk of dementia:
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Protective factors include:

- Educational level
- Intellectual and social engagement
More about physical exercise

• Benefits for the brain – how it might work
  – Increase blood flow: nutrients, toxins
  – Cognitive stimulation
  – Social engagement possible
More about physical exercise

- Benefits for the brain – how it might work
- Benefits for the body – special considerations for dementia
  - Loss of function
  - Fear
  - Increasing need for assistance
More about physical exercise

• Benefits for the brain – how it might work
• Benefits for the body – special considerations for dementia
• How much, how often?
  – ???
More about physical exercise

• Benefits for the brain – how it might work
• Benefits for the body – special considerations for dementia
• How much, how often?
• Other factors
  – Nature
  – Depression
Post-diagnosis treatments which have good evidence for benefiting cognition:

- **Medication**
  - Anti-depressants
  - High blood pressure medication
Post-diagnosis treatments which have poor evidence for benefiting cognition:

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  - Acetylcholinesterase inhibitors (e.g. donepezil, galantamine, and rivastigmine)
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  - Vitamins and other supplements
Post-diagnosis treatments which have poor evidence for benefiting cognition:

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Note: poor evidence = lack of rigorous studies
Post-diagnosis treatments which have poor evidence for benefiting cognition:

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- ‘Brain training’
  - Generalised cognitive or memory improvement through ‘mental exercise’ have not been proven to be effective.
  - Where improvements have been seen, they are usually limited to the **specific cognitive task** engaged in the intervention, rather than any wider effects that could improve the person’s capacity for independent living.
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- ‘Brain training’
- Art, music, and reminiscence therapies
Carers often left out of the picture. Issues for carers include:

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• Burden of care: lots of support needed, including coping strategies and education about effect of dementia and changes in person over time
• Respite, wellbeing, and quality of life of carer
• Can enable or prevent person with dementia engaging in activities – need support to understand and help engagement
In summary: what can we do?

- Studies are starting to look at the effects of combined healthy lifestyle factors.
- But don’t wait for iron-clad ‘proof’ of what works; there is a lot of evidence that lifestyle factors can have an impact.
- We should take up healthy lifestyle factors as soon as possible in our own lives, but it’s never too late for older people to begin as well.
- This should be more strongly put forward in public health messages.
- We also need to make sure carers are well-supported.