Ticking off dementia prevention; what do we know and where are we going with prevention?

Professor Kaarin J. Anstey

Centre for Research on Ageing, Health and Wellbeing
Dementia Collaborative Research Centre – Early Diagnosis and Prevention
The Australian National University
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Prevalence of dementia globally

- Worldwide prevalence > 65 is 5-7%
- 35.6 Million living with dementia in 2010
- 65.7 Million expected by 2030
- More prevalent in women, particularly at older ages

Risk reduction may delay cognitive decline and reduce incident cases of dementia

Prince et al, Alzheimer’s and Dementia, 2013
Prevalence of Dementia in Asia, Australasia and Europe by age

How could Alzheimer’s Disease be prevented – (hypothetically)?

- Administering a pharmaceutical that prevented the pathology developing (not yet possible)
- Immunization (not yet possible)
- By intervening in people who have very early pathology but no symptoms, to prevent symptoms (maybe??)
- By intervening to prevent factors that increase the risk of the disease at the population level (possible)
About ‘Risk factors’

- Increase the chance AD will occur
- Not necessarily causes but may be causes
- Have an actual value – ie a risk of 2 means that the risk factor confers twice the chance of the disease occurring
- May be ‘modifiable’ or ‘non-modifiable’
- The evidence for risk factors may be very strong, moderate or weak depending on how much research has been conducted
Example Risk Factor: Smoking and lung cancer

- Among male smokers, the life time risk of lung cancer is about 17.2%
- Smokers:non-smokers 10:1 risk of developing lung cancer
- Dose response relationship – people who smoke more cigarettes per day have greater risk of lung cancer
- There is a mechanism by which smoking can cause cancer ie carcinogens in cigarette smoke
- Genetic factors, other exposures (eg. solvents) affect risk
- Some non-smokers still develop lung cancer
How early do the changes of Alzheimer’s Disease start?

Neurofibrillary tangles occur in the 40s

Amyloid occurs from the 50s
Translating dementia research into practice
What are the risk factors for Alzheimer’s Disease and Dementia?

Six categories of risk factors have been evaluated

- Genes
- Demographic
- Psychosocial factors
- Medical conditions
- Lifestyle factors
- Toxic exposures
### Demographic risk factors

<table>
<thead>
<tr>
<th>Condition</th>
<th>Risk increased</th>
<th>Level of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Yes</td>
<td>Very good</td>
</tr>
<tr>
<td>Low education</td>
<td>Yes</td>
<td>Very good</td>
</tr>
<tr>
<td>Occupation</td>
<td>No</td>
<td>Good</td>
</tr>
<tr>
<td>Female</td>
<td>?</td>
<td>Mixed results</td>
</tr>
<tr>
<td>Country</td>
<td>Yes/no</td>
<td>Prevalence differs by country</td>
</tr>
</tbody>
</table>
## Social, cognitive, physical activity

<table>
<thead>
<tr>
<th>Condition</th>
<th>Risk increased</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unpartnered</td>
<td>Yes</td>
<td>Fair</td>
</tr>
<tr>
<td>Low social networks</td>
<td>Yes</td>
<td>Good*</td>
</tr>
<tr>
<td>Low cognitive engagement</td>
<td>Yes</td>
<td>Good*</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>Yes</td>
<td>Good*</td>
</tr>
</tbody>
</table>

* Note dementia reduces these as well
Cognitive training

- ACTIVE TRIAL (Ball et al., JAMA, 2002; Willis et al., JAMA, 2006)
- RCT evidence showing that Cognitive training is protective against *cognitive decline* ie the ACTIVE Trial.
- Mean at 74+ at baseline
- 5 week training period in either reasoning, memory or processing speed.
- Benefits maintained at 5 year follow-up
- Not enough evidence on MCI or AD yet
Mediterranean diet
- Protective in cohort studies
- Fish 3+ times per week is protective

Pesticides
- Occupational exposure increases risk - good evidence

Smoking
- doubles the risk of dementia
# Medical conditions and medications

<table>
<thead>
<tr>
<th>Condition</th>
<th>Risk</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head injury</td>
<td>Yes</td>
<td>Good</td>
</tr>
<tr>
<td>Depression</td>
<td>Yes</td>
<td>Good</td>
</tr>
<tr>
<td>Anxiety</td>
<td>?</td>
<td>Mixed</td>
</tr>
<tr>
<td>Statins</td>
<td>Reduced</td>
<td>Mixed, inconclusive</td>
</tr>
<tr>
<td>Antihypertensives</td>
<td>Reduced</td>
<td>Fair</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Yes</td>
<td>Good</td>
</tr>
<tr>
<td>Obesity midlife</td>
<td>Yes</td>
<td>Good</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>Yes</td>
<td>Fair-good</td>
</tr>
</tbody>
</table>
Cognitive and brain change in quitters

Trial of smoking cessation: 36 Never smokers, 48 unsuccessful quitters, 36 successful quitters (Almeida et al., 2011, Neuroimage).

Quitters showed no cognitive decline but UQ did

Unsuccessful quitters showed more atrophy
Vascular Risk reduction worked in Adults with cognitive impairment to prevent dementia

- Observational study of 837 MCI patients followed for 5 years AD patients (mean age 72)
- 298 converted to Alzheimer’s
- Diabetes, high BP, cerebrovascular disease, high cholesterol were associated with conversion
- Patients who had their risk factors treated has lower rates of conversion to Alzheimer’s disease

Li, et al, Neurology, 2011
What can we do now to promote cognitive health and dementia risk reduction?

- Promote physical activity, not smoking, eating fish, maintaining healthy weight
- Prevention or optimal management of diabetes, hypertension
- Promote education, cognitive engagement and social engagement
- Promote avoidance of head injury and pesticide exposure
What can you do?

ANU Alzheimer’s disease risk index (ANU-ADRI)

• Self report measure of AD risk
• Developed on the basis of data synthesis of risk-ratios associated with 11 risk and 4 protective factors
• Does not require a clinical assessment or laboratory tests
• An overall AD risk score is derived

Anstey, Cherbuin, Herath (2013), Prevention Science.

http://anuadri.anu.edu.au/
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