Ageing Brain and Dementia in 21st Century Sri Lanka: points to ponder

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Objective

To sensitize on,

- population trends in Sri Lanka
- concepts of ageing
- how ageing affects life
- healthy ageing
- introduction to dementia
- detection and management of dementia
- future directions for ageing in Sri Lanka
Defining “Old” – World Health Organization

- In the developed world \( > 65 \)
- UN agreed cut off \( 60+ \)

- 1870 Britain – the friendly societies act defined old age as any age after 50

- In many developing countries old age begins at point when active contribution is no longer possible (Gorman, 2000)
Definition for developing countries

Three main categories

- Chronologically
- Change in social role (e.g. work patterns, adult states of children and menopause)
- Change in capabilities (i.e. invalid status, senility, changes in physical characteristics)

Self definition of “old” often include health related changes
Terms used

- Elderly person
- Old person
- Senior citizen
- Late adulthood
- Life expectancy - LE
- Active life expectancy - ALE
- Disability adjusted life expectancy - DALE
- Quality adjusted life years – QALY
- Disability adjusted life years - DALY
Life expectancy at birth—Sri Lanka
1920–2011
<table>
<thead>
<tr>
<th>Year</th>
<th>Male(years)</th>
<th>Female(year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1920-22</td>
<td>32.7</td>
<td>30.7</td>
</tr>
<tr>
<td>1945-47</td>
<td>46.8</td>
<td>44.7</td>
</tr>
<tr>
<td>1952</td>
<td>57.6</td>
<td>55.5</td>
</tr>
<tr>
<td>1962-64</td>
<td>63.3</td>
<td>63.7</td>
</tr>
<tr>
<td>1970-72</td>
<td>64.0</td>
<td>66.9</td>
</tr>
<tr>
<td>1980-82</td>
<td>67.7</td>
<td>72.1</td>
</tr>
<tr>
<td>1991</td>
<td>71.1</td>
<td>74.8</td>
</tr>
<tr>
<td>2000-02</td>
<td>68.1</td>
<td>76.6</td>
</tr>
<tr>
<td>2006</td>
<td>68.4</td>
<td>77.1</td>
</tr>
<tr>
<td>2011</td>
<td>68.8</td>
<td>77.6</td>
</tr>
</tbody>
</table>
Population pyramids for Sri Lanka

Sri Lanka: 2000

Sri Lanka: 2010

Sri Lanka: 2020

Sri Lanka: 2050

Source: U.S. Census Bureau, International Data Base.
Ageing

• How to define?
  • Chronologically - easy
  • Biologically - difficult
  • Sociologically - more difficult
Ageing – Biological approach

Theories of Ageing

- Programmed theory of ageing
- Running out of program theory
- Mutation theory of ageing
- Autoimmune theory of ageing
- Cross-linking theory
- Free radical theory
- Cycling/non cycling cell theory
- Error catastrophe theory
- DNA repair mechanisms
- Other Theories
Ageing – Biological approach

- Ageing process is determined by,
  - genes - 25%-33%
  - external factors e.g. life style
## Ageing – Sociological approach

<table>
<thead>
<tr>
<th>Theoretical perspective</th>
<th>Major assumption</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disengagement</strong></td>
<td>To enable younger people to assume important roles, a society must encourage its older people to disengage from their previous roles and to take on roles more appropriate to their physical and mental decline.</td>
</tr>
<tr>
<td><strong>Activity theory</strong></td>
<td>Older people benefit themselves and their society if they continue to be active. Their positive perceptions of the ageing process are crucial for their ability to remain active.</td>
</tr>
<tr>
<td><strong>Conflict theory</strong></td>
<td>Older people experience age-based prejudice and discrimination. Inequalities among the aged exist along the lines of gender, race and ethnicity, and social class</td>
</tr>
</tbody>
</table>
Ageing – Sociological Approach

- Structuring the life course through age
  - Age links memories (past) with anticipation (future)
    - Interaction with younger selves and older selves
  - Continuities and discontinuities that has to be negotiated
    - retirement
    - widowhood
    - other aspects
  - Life transition as an expression of life course through age

- Generation and cohort

- complementary perspective
  - narrative gerontology, social constructionist approach
Changes in the ageing brain

- Weight reduction
  - after 30 years 5% - till 70 years afterwards - dramatic loss
- Ventricles enlarge
- Meninges thicken
- Loss of neurons
- Reduction in synapses and dendrites
- Appearance of Lipofuscin, senile plaques, neurofibrillary tangles and Lewy bodies

Changes are much more in dementia
Why the longevity?

- Overall slowing of ageing process

  OR

- Resistance to major life threatening pathologies
  - Sanitation
  - Improved medical treatment
  - Improved diagnosis
  - Memory and disease modifications
    - Alzheimer's
    - Cancer
Life cycle approach to ageing

- Infancy: < 1
- Toddler: 1 – 2 1/2
- Preschool: 2 1/2 – 5
- Middle childhood: 5 – 12
- Adolescence: 12 – 18
- Early adulthood: 18 – 40
- Middle adulthood: 40 – 65
- Late adulthood: > 65
Middle Adulthood

- Physical changes
  - loss of elasticity in the skin
  - changes to the texture and color of hair
  - decreased ability in seeing and hearing

- Cognitive changes
  - slowing of fluid intelligence (speed of thought processing)
  - increase of crystallized intelligence
  - loss in working memory
  - gain in semantic memory

- Social changes
  - variation in employment
  - caring for elderly relatives
  - children leaving home
  - difference in parental responsibilities
Late adulthood

- Physical changes
  - progressively weakened immunity and physical abilities

- Cognitive changes
  - sharp decrease in intellectual functioning

- Social changes
  - decrease in quality of social interactions due to age discrimination or stereotyping
  - social segregation due to cultural differences
  - loss of a comfortable network of co-workers, friends, family, and community members due to relocation, death

Despite above limitations late adulthood can be the prime time of life to those who are ready for it
Healthy ageing

- Physical health
- Mental health
- Social networks
- Economic security

- Physical and mental activities
- Physical contact
- Being involved
- Keeping busy
- Focused on the present and the future
- Keep old friends and develop new ties

  E.g. Over fifty club
  - Birds of a feather flock together
  - E.g. Retirement villages
  - Retirement plans
Delaying ageing

- Calorie restriction and otherwise nutritionally adequate diet - only proven method to expand lifespan of mammals

- Calorie restriction together with exercise – beneficial

- ‘late life capabilities have their genesis in early life’
Retirement

Retirement most often is defined with reference to two characteristics:

- nonparticipation in the paid labour force
- receipt of income from pensions, social security, and other retirement plans


‘Retirement is a life event with major life style adjustments’
Successful ageing

Three major processes

- Selection, limiting focus to a few areas of expertise or interest
- Optimization
- Compensation - using a window when the door is shut (resourcefulness)

These processes are helpful for people in the late adulthood stage because they experience more losses than when they were younger

(Broderick & Blewitt, 2003).
Ageing - points to ponder...

- Today young adults are tomorrow elders
- Preparation is the key to success
- Modifiable factors of longevity are related to life style
- Habits and many relationships are continuations of younger life
Dementia

Acquired global impairment of intellect, memory and personality, without impairment of consciousness.
Dementia

- Alzheimer’s disease: 50-60%
- Vascular dementia: 20-25%
- Dementia with Lewy bodies: 15-20%
- Dementia in other diseases:
  - Pick’s disease
  - Creutzfeld-Jacob disease
  - Parkinson’s disease
  - Huntington’s disease
  - Human immunodeficiency Virus (HIV)
The continuum of dementia

- Cognitive function
- Preclinical
- MCI
- Dementia
- Aging

Years
Mild Cognitive Impairment (MCI)

Symptomatic, predementia phase

- Degree of cognitive impairment is not normal for age
- Can be considered as a subset of the many causes of cognitive impairment that are not dementia (CIND)
  E.g: head trauma, substance abuse, or metabolic disturbance
Diagnosis of dementia

- Delay in diagnosis:
  - Symptoms attributed to normal ageing
  - Delay in seeking help
  - Low priority in diagnosis
  - Family’s response to stigma
  - Other health systems
Alzheimer’s Disease

- 1906 - by Alzheimer

- Prevalence - 5% of > 65 yrs
  - 20% of > 80yrs

- Pathology-
  - Brain is shrunken
  - Widened sulci and enlarged ventricles
  - Dendritic cell loss
  - Proliferation of astrocytes
  - Increased gliosis
  - Senile plaques and neurofibrillary tangles in cortical and sub cortical grey matter

- Aetiology
  - Genetic
Clinical features of dementia

- **Cognition**
  - poor memory
  - impaired attention
  - aphasia, agnosia, apraxia
  - disorientation

- **Behaviour**
  - odd and disorganised
  - restless, wandering
  - self-neglect
  - disinhibition

- **Mood**
  - anxiety
  - depression

- **Thinking**
  - slow, impoverished
  - delusions

- **Perception**
  - illusions
  - hallucinations

- **Insight**
  - impaired
Dementia Management

Diagnosis
- By a specialist

Management
- Commenced by a specialist
- Could be carried out by a family physician
Diagnosis

- History - collateral history
- MSE - points to diagnosis “depressive pseudo-dementia”
- Extended cognitive function tests - lobar functions, MMSE
- Investigations – to detect treatable causes
- Multidisciplinary team assessment – for proper management
Mental State Examination

- Appearance and behaviour
- Speech
- Mood
- Thought content
- Perception
- Cognitive functions
  - Orientation - time, place, person
  - Attention – digit span
  - Concentration - days of the week backward
  - Recent memory - 5 item address / three unrelated items
  - Remote memory - personal and non personal information
- Insight
Clock Drawing Test

Samples of clock drawings from Alzheimer patients with dementia.
Investigations

- Urine full report
- Liver
- Renal profiles
- Thyroid
- FBC
- FBS
- Vitamin B12, folate levels
- Chest X ray

When indicated
VDRL
CT/MRI
HIV/AIDS
Management

Depends on the

- severity
- cause
- impact - on the family

of the disease
Management issues...

- treat the *cause* (if found)
- retaining abilities
- prevent progression as much as possible
- improving *quality of life*
- reducing complications / treat complications
- preparing for the future
- improving care givers health
- networking
Treat the cause

E.g.
- Hypothyroidism
- Vascular dementia
- HIV/AIDS
- Other metabolic disorders
- Vitamin deficiencies
Drug therapy

- General considerations:
  - Avoid poly-pharmacy
  - Consider drug interactions
  - Simplify regime
Drug treatment of Alzheimer's disease

- Delay disease progression in some
- Reduce care giver’s burden

With treatment:

- 1/3 - better
- 1/3 - prevent progression
Approved anti-dementia drugs

- Donepezil
- Rivastigmine
- Galantamine
- Memantine
Donepezil

- Piperidine derivative
- Reversibly inhibits acetyl cholinesterase
- Starting and minimal effective dose - 5 mg once;
- maximum: 10 mg /day
Rivastigmine

- Carbamate derivative
- Reversibly inhibits both AChE and BChE
- Starting dose is 1.5 mg bd
- Minimal effective dose is 3 mg bd
- Maximum: 6 mg bd
Galantamine

- Tertiary alkaloid
- Reversibly inhibits AChE
- Starting and subsequent doses are 8 mg, 16 mg and 24 mg daily
Memantine

- Non competitive NMDA glutamate receptor antagonist
- Starting dose is 5 mg daily
- Maximal dose is 20 mg daily
Adverse effects of AChE inhibitors

- nausea, vomiting
- diarrhea
- anorexia
- muscle cramps
- vivid dreams
- cardiac rhythm abnormalities
Treatment expectations of anti-dementia drugs

- Repetitive questioning – Often met; signifies robust response to treatment
- Temporal disorientation – common and often met
- Having better initiative – commonly met; signifies robust treatment response
- Spatial disorientation – Inconstantly met
- Misplacing objects – very uncommonly responds to treatment
Retaining abilities

- Safe activities
- Preparing lists of daily activities
- Educating care givers to encourage activities
- Providing support
Prevent progression

- Treat cause
- Treat co-morbidities
- Monitor and treat complications
  - e.g.
    - urinary tract infections
    - respiratory tract infections
    - constipation
- Early use of anti dementia drugs for Alzheimer's disease
Improve quality of life

- Physical
  - nutrition
  - hygiene
  - co-morbidities
  - medication e.g. side effects

- Psychological

- Social  “supportive persons”

- Spiritual
Prepare for the future

*Involve patient in decision making*

- The will
- “Advanced directive”
- Financial handling
- Legal aspects
- Improving quality of life
Caregiver’s Health

- Share responsibilities among the family
- Time off for caregivers without feeling guilty
- Meet their emotional needs
- Time off for pleasurable activities

- Care giver’s support groups
Networking

- Local agencies
  - Psychiatrist
  - General Practitioner
  - Physician
  - Neurologist
  - Social worker
  - Care Homes
  - NGO’s
  - Primary health care team

*Know limits and boundaries*
## Prevention of Dementia

### Alzheimer's
- **Risk factors**
  - Low education
  - Head injury
  - Cerebrovascular disease
  - Depression
  - High homocysteine
  - Diabetes
  - ApoE4
- **Protective factors**
  - NSAIDs
  - HRT
  - Statins
  - Cognitive activity
  - Physical activity

### Vascular
- **Risk factors**
  - Vascular disease
  - Metabolic disease
- **Protective factors**
  - Healthy diet
  - Exercise
  - Weight control
  - Moderate alcohol
  - No smoking
  - Blood pressure control
  - Control of diabetes

### Parkinson’s
- **Risk factors**
  - Toxins
  - Solvents
  - CO
  - Well water
- **Protective factors**
  - Smoking
  - Caffeine

Most are not proven...
Numerous studies have shown that cognitive training benefits healthy elderly individuals.

Commercially available computerized brain-training programs lack empirical support.

The SIMA (Maintaining and Supporting Independent Living in Old Age) study demonstrated that a combination of memory and psychomotor training significantly improved cognitive status in healthy elderly people (75-89 years) after 1 year of training.

All participants (aged 65-94 years) in the ACTIVE (Advanced Cognitive Training for Independent and Vital Elderly) study showed significant improvements in distinct cognitive functions—memory, reasoning, problem solving and speed of processing.
Research on dementia

Pharmacological
- AchE- I ? Similar efficacy, ? Donepezil better
- Memantine, for severe dementia
- LASER – AD - Mild AchE - I less mortality
- Vascular contributions to cognitive impairment and dementia
  - smoking, alcohol, Donepezil – good evidence
  - antioxidants, rivastigmine, galantamine – poor evidence

Non pharmacological
- Adaptation and Coping Strategies and Psychosocial Treatments - effects are medium and comparable to the effects on cognition of anti-Alzheimer’s disease medication

Treatment of behavioural and psychological symptoms of dementia
- CATIE – AD study
- Mortality of antipsychotic use – Haloperidol 20%, Olanzapine 12.6%
Ongoing and future research

- **Symptoms**
  - Study of social behavior and emotion in frontotemporal dementia, Alzheimer's disease and controls

- **Pharmacological**
  - Clinical trial of donepezil between the patients with Alzheimer's disease and mixed dementia

- **Non pharmacological therapies**
  - Evaluating the effects of music interventions on hospitalized people with dementia

- **To find associative and causative factors**
  - Evaluation of a diet in patients with senile dementia
# Dementia in Sri Lanka - future directions

**Clinical**
- Early detection and proper management – management protocols
- Psycho geriatric units in hospitals
- Disease modifying drugs
- Day centers
- Caregivers’ support groups

**Social**
- Community support for those who live at home
- Support to live with dignity
- Financial assistance
- Respite admission units
- Shelter for demented

**Policy**
- Legal framework to safeguard rights
- Policy for community care

**Research**
- Brain research
- Clinical research
Dementia in Sri Lanka future directions

Points to ponder
- Diversity of population
- Varying needs
- Service planning according to diverse needs
  - participatory
  - affordable
  - respectful
  - sensitive to caregiver needs

Research
Healthy life style - health promotion
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‘Late life capabilities have their genesis in early life’

- Individual
- Society & politics
- Scholars *

Brain

Life style

- Individual
- Society & politics
- Scholars
  - wisdom and voice
Objectives

- Population trends in Sri Lanka
- To sensitize on concepts of ageing
- How ageing affects life
- Healthy ageing
- Introduction on dementia
- Detection of dementia
- Management of dementia
- Future directions for ageing and dementia in Sri Lanka
“Add life to years that had been added to life....” (WHO)
THANK YOU!